

In This Issue—At the New York Show

MOTOR AGE

Vol. XLIII
Number 2

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JANUARY 11, 1923

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Withdrawn Jan. 27, 1925
Jan 4; 25
Feb. 8; 22



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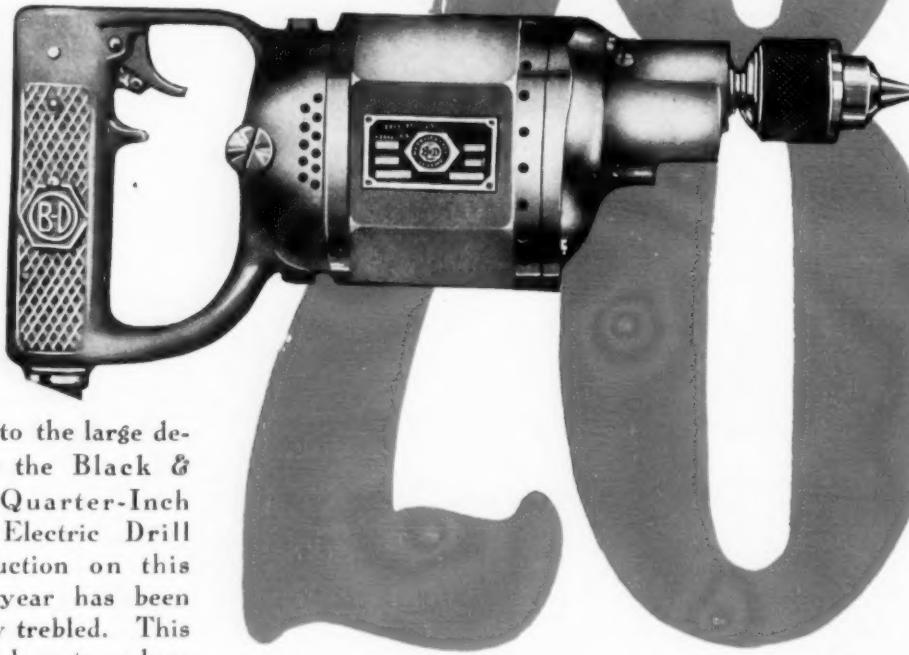
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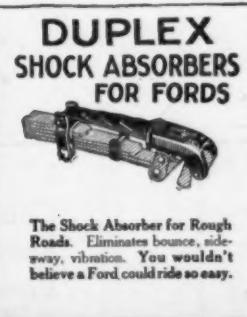


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CLEVELAND, OHIO

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Chicago Show—Exhibit Space A-3 Coliseum, Peerless Headquarters Congress Hotel



MOTOR AGE

Published Every Thursday by
THE CLASS JOURNAL COMPANY
 MALLERS BUILDING
 59 East Madison Street,
 CHICAGO, ILLINOIS, U. S. A.

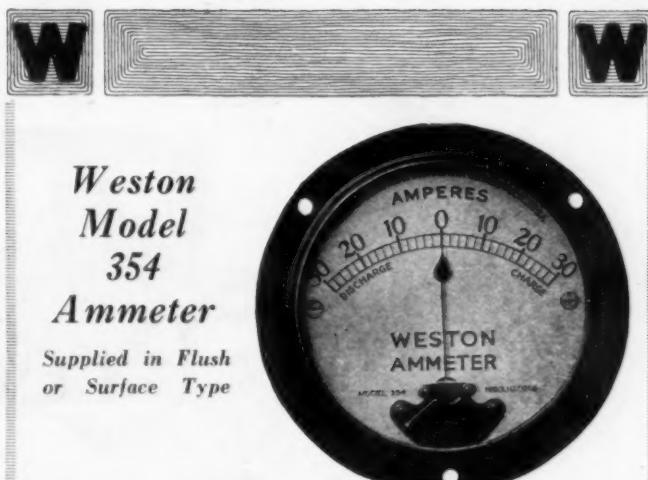
Vol. VLIII Chicago, Jan. 11, 1923 No. 2

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SUBSCRIPTION RATES	
United States, Mexico and U. S. Possessions.....	\$ 3.00 per year
Canada.....	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies.....	35 cents
Subscriptions accepted only from the Automotive Trade	
Entered as Second Class Matter Sep ¹⁹ , 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.	



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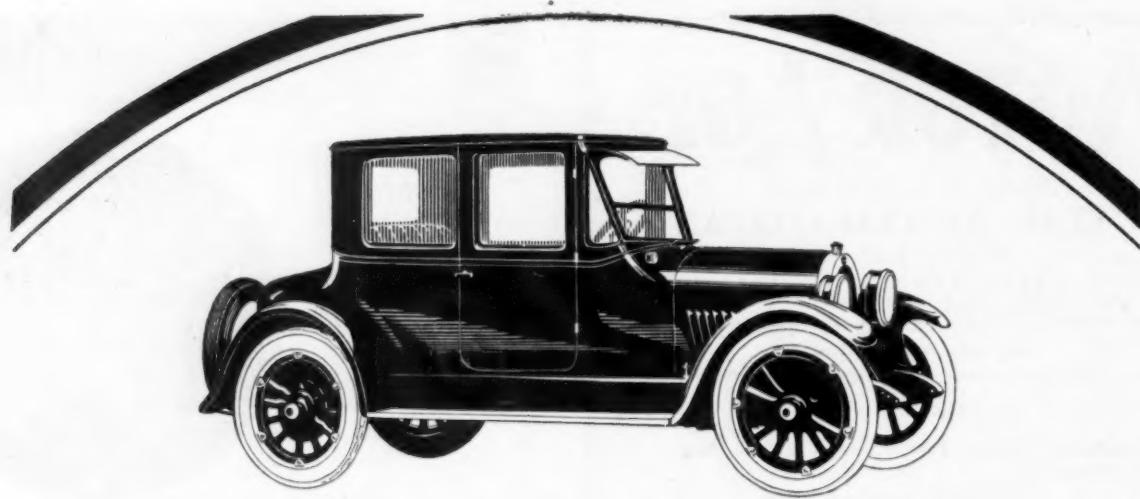
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The engineering, research and purchasing facilities of the General Motors Corporation contribute largely to Oldsmobile quality.



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Rendering Service to Help You Render Service

A Reference Guide

An automotive man, of course, takes a different view of an automobile show from any other spectator. This is only natural. He needs to know a great many things about the exhibits that even an expert observer cannot learn by studying the chassis at the show. Even though he could, it would be practically impossible for him to remember such a mass of details as would be presented to him.

This, then, is the reason that at show time MOTOR AGE publishes its Annual Show Issue and Specification Number. In it are printed scores of tabulations; more than any person could read at any one time and remember. These specifications, we believe, are a basis of study and reference and not something to be read and discarded. In fact, they will present a complete analysis of all the cars for 1923.

Properly, that number of MOTOR AGE, dated January 25, is not merely a story of just one of the National Shows but should be regarded as a reference book for the entire year—and it will be—you'll want to save yours too.

Nash Leads the World in Motor Car Value

A New Year With New Models and a Still Stronger Franchise

After the greatest year in our history Nash enters 1923 with a complete new line of both Fours and Sixes.

And, in addition, there are now included in the range of cars two entirely new models—the Nash "Six" Four-Door Coupe and the Nash "Four" Sport car.

Once again the dealer fortunate enough to hold a Nash franchise benefits by the progressiveness of the Nash Motors Company.

Today he finds himself armed with finer cars and greater values than ever before, together with a market that has been widened by two new types of cars.

So far as competition is concerned he now occupies an even more impregnably entrenched position.

So far as profits are considered, he faces a year that should exceed substantially his best previous year.

And now we can allot several very attractive territories to dealers worthy of a Nash connection. Write at once.

NASH

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value (1038)

IF you were a Marmon Dealer—

—you would be selling a car whose maintenance figures for 1922 stamp it as the most dependable and economical Fine Car on the market—dependable because it spends the shortest time in the service station and therefore the longest time in actual use; economical because it costs less to maintain than any other car in its class.

You would have these advantages, not as the mere unsupported claims of a car builder, but as proved by a nation-wide investigation that revealed an average upkeep cost of only \$4.71 per car per month for the 1922 Marmon.



The Seven Passenger Convertible Phaeton with The Sedan Sides in place—a closed car right now, an open car next spring—a fine motor car the year round all at the price of an open car. Write for the catalogue that describes all Marmon models and the many exclusive Marmon advantages; also the book "Modern Transportation Costs," describing Standardized Service.

You would have the same car that made this amazing record possible, with the 1923 line still further improved by exquisite new body creations incorporating year-ahead principles of design.

Your contract would be direct with the factory, thus protecting you against unjust cancellation at the hands of a distributor. Your selling, service and organization problems would have the personal attention of a staff of specialists whose whole time is devoted to helping Marmon dealers improve their efficiency and productivity.

Write for a copy of "How to Shop at the Show" which gives an idea of Marmon merchandising features and methods.

NORDYKE & MARMON COMPANY

Established 1851

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The Foremost Fine Car



A Line for All-Season Sales

REO enters its 19th year with a position of established leadership—physically, financially and by reputation.

Few institutions in the industry have the confidence of the buying public in such measure as Reo. Seldom do Reo owners change to other makes.

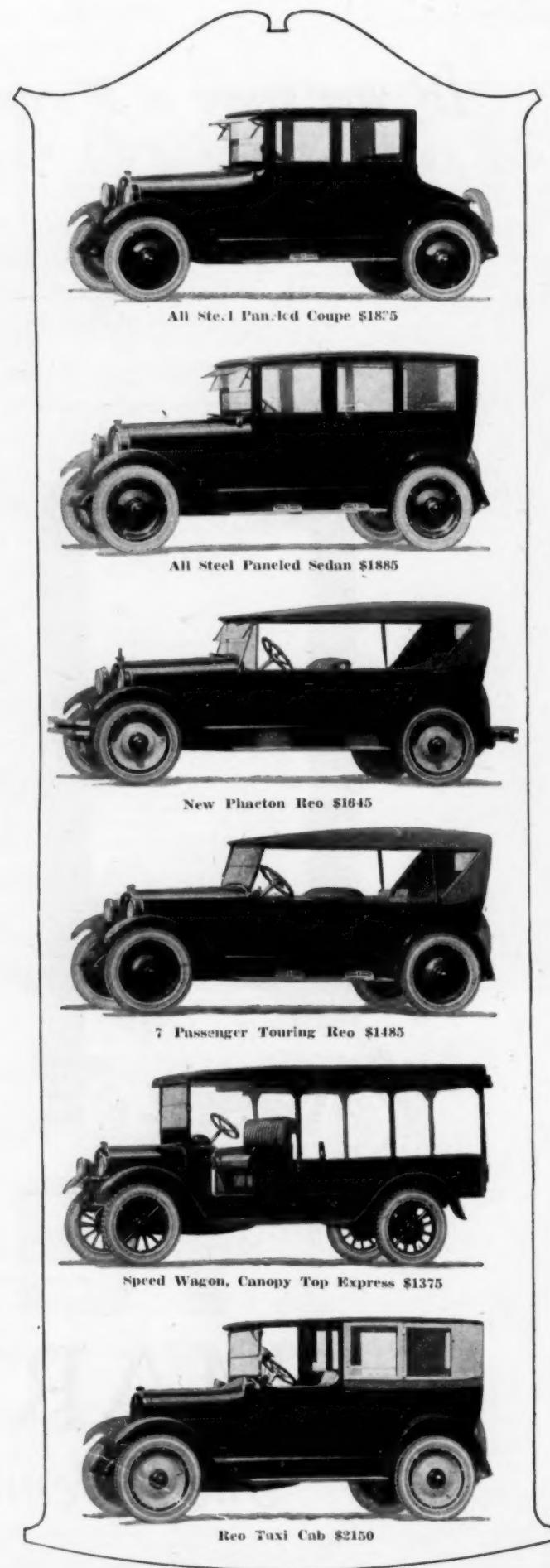
Eighteen years of wonderful experience is embodied in the Reo line; and the public knows it!

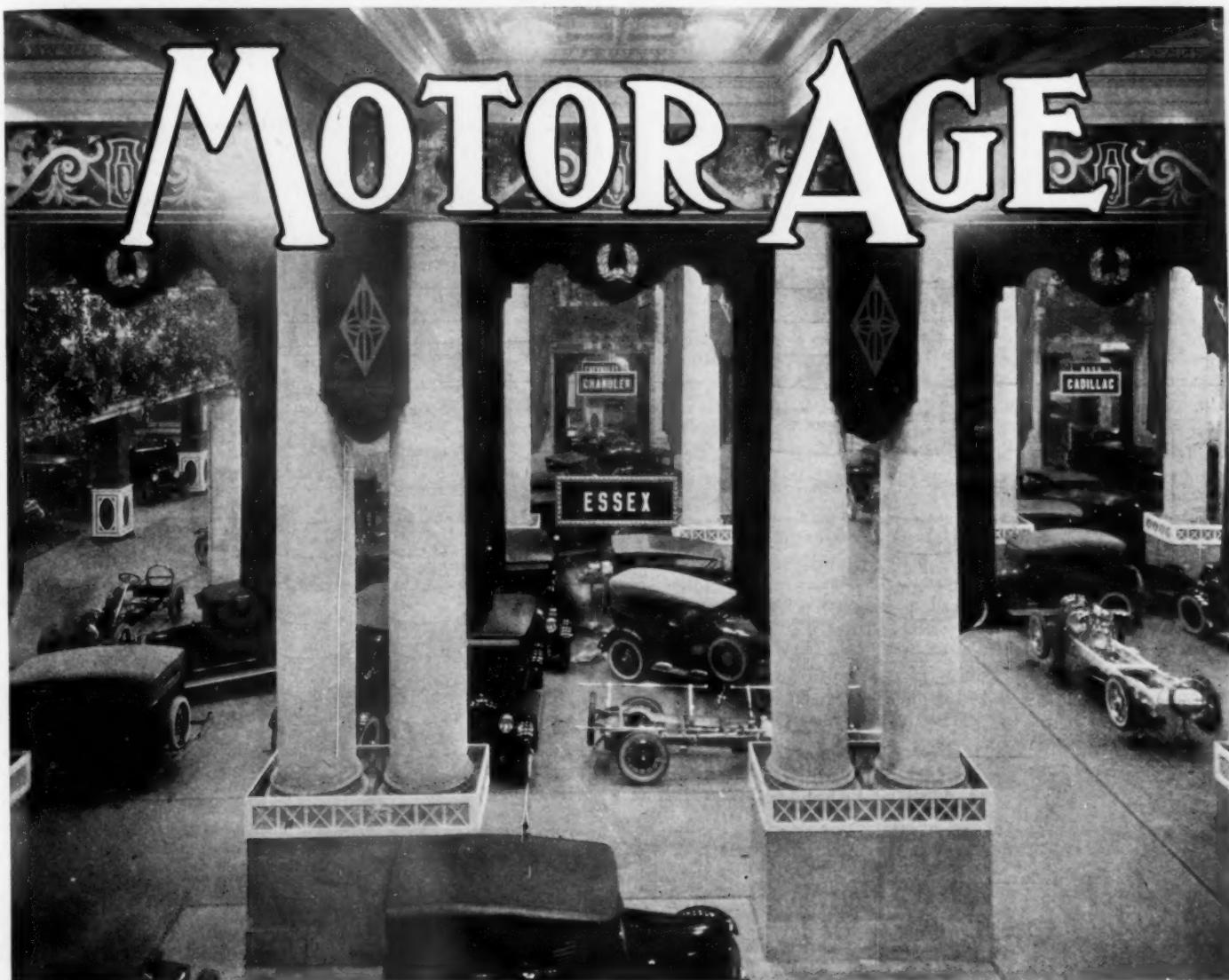
With two open cars, two closed cars, the Reocab and the Speed Wagon (in 12 standard body styles) Reo truly supplies a line for year 'round sales.

Reo reliability and Reo service are bywords in motordom. Now add the factors of beauty and remarkably low prices! Is it any wonder that the Reo franchise has unusual value?

Territory is limited and few dealer changes are contemplated; but applications will be carefully considered.

Reo Motor Car Co.
Lansing, Mich.





Merchandising Interest Predominates at the New York Show

*Engineering Developments Show Distinct Trend Toward Meeting the
Demands of Maintenance*

By CLYDE JENNINGS

New York, Jan. 7.

HERE are many angles of interest in the first of the 1923 automobile shows, but the merchandising interest is undoubtedly the most prominent feature. The exhibits and the cars themselves are evidence of the thought that the manufacturer has been giving to lending as much help as possible to the salesman.

It is a colorful show. That, of course, was guaranteed in advance by the very fact of the numerous sport models that have been brought out during the last few months and which occupy a prominent place in the exhibits. These

brightly painted and ornately trimmed cars are a match for the car that formerly was called a "show model" and they are popular with the visitors.

Rivaling these cars in public interest are the closed "show models." Some of these are rather weird in their effects, but nevertheless they stop and hold the observer for a time and likely lead him into the exhibit.

There are many evidences that the New York dealers, who supply the salesmen for this show, have taken the show more seriously than before. The salesmen in the various booths are

much alive to their opportunity. There is every evidence of interest in the visitor and much open solicitation greets you as you walk about the show. It is well done and after being solicited by a dozen or more salesmen, a visitor cannot recall any undue pressure or any unpleasant experiences.

This result has been brought undoubtedly by the numerous and earnest sales meetings held by the New York distributors in advance of the show. The Chicago plan of holding a general meeting and having one optimist pep up all of the salesmen with one over-the-top speech was not followed in this case, but rather the salesmen were gathered under their own chiefs, aided and abetted by a factory sales expert, and they were carefully drilled in show sales methods and on their own car, especially the 1923 features.

The net result of this training is some very intelligent conversation on cars in general and better information on the new models than any one ever heard before at a New York show. This sales presentation is not yet 100 per cent, but the improvement is sufficient to be encouraging to any one who takes the automobile business seriously. There are still a few salesmen who apparently take the show as a vacation and an opportunity to view the public from the high and mighty point of a man who knows everything that the public wants to know.

The sales interest, however, does not monopolize the features of the show. There is much left to interest the maintenance man, the engineer, the accessory man and any other branch of the industry. The show would not be especially notable to a Motor Age reader for new models, except that it would in many cases be his first opportunity to see and touch cars that he has read descriptions of. The new Chandler attracted a lot of attention from everybody, from the most astute engineers down to the merely curious person.

The light Premier was in some ways a radical car for that name plate and was described by the spokesman in the booth as "the first European light car born in America." It is priced at \$595 for a touring car, but was shown only as a chassis with the promise of 35 miles to the gallon.

The Apperson Junior, which was announced some weeks ago but had not previously been described, was present. The new Nationals were objects of interest. Auburn, too, was showing a new model.

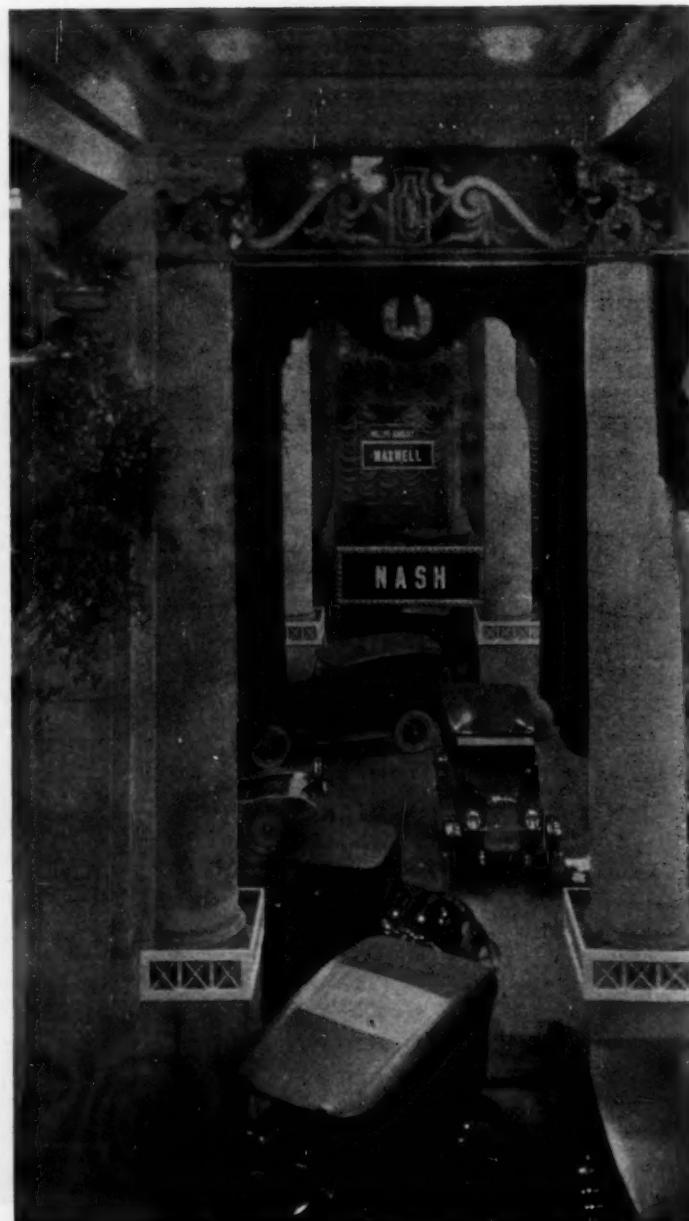
The copper cooled Chevrolet always had a crowd about it and none of the professionals who visited the show passed up an opportunity to inspect closely this engineering novelty. It was announced that this car would sell for \$200 more than the Chevrolet Superior line.

There was considerable comment that the changes were in the main for better maintenance, especially from the point of accessibility. This was especially notable in the engine changes.

The new models, however, had to divide the attention with the cut-out chassis and other moving attractions. Greeting the visitor at the front door was a Buick chassis swung on pivots and kept turning so that the visitor by standing a few minutes could see the parts that make the car an efficient transportation unit from any angle. The cutout feature of this car gave to the man who "gets out and gets under" a decided treat of not only being comfortable while he got an underview of the chassis but he saw many things which had been unseen by him before. The Cadillac had a cutout chassis that won many admiring comments from even the engineers. This was declared to be one of the best cutout jobs ever shown.

It was true that wherever a booth holds one of these stripped chassis jobs there is always a crowd and the more that this chassis shows, the greater the crowd and the more interest is displayed. People generally appear to be hungry for some information as to why the wheels go 'round and the lecturers who talked on these chassis testify that the women visitors ask many questions, in the main bringing out fundamental information.

Apparently there is a distinct trend on the part of manufacturers of higher priced cars to add to their line a lower priced car which will carry the dealer interest. It is evidence of a trend toward a demand for exclusive dealerships in all sizes of towns. There appears to be a danger point ahead in



One of the inviting corridors where 1923's unexcelled automotive products are displayed

this tendency for some of the manufacturers who are following the leaders in this tendency, as it would naturally bring about so many exclusive franchises that the smaller city cannot support representatives of all of these lines.

In many cases where a manufacturer has made a distinctive car selling for more than a medium price, he has had the advantage of the dealer in a lower priced line selling some of his cars as a more or less deluxe line in the community. Now he will be forced to take on the lower priced line and compete directly with the big production jobs.

An interesting feature that many old timers referred to with a touch of regret in their voices was the fact that three of the long advocates of the high class four cylinder cars had added sixes to complete their lines. This is the case with Mercer, Stutz and H. C. S.

The interest in prices is not great. Few price changes of importance are announced or anticipated. It appears that for the most part the manufacturers have got the price unrest out of their blood and will do nothing more until they are assured as to the manufacturing schedules for the coming season. Cole made the most radical change and with this is a new idea of merchandising by this company. The drop in price from \$2,685, to \$1,885 for the touring model was coupled with the announcement of a reduction in dealer discount. It was made

a point in explaining this new arrangement that the factory felt that there had been too many trading-in sales and that the new price and the lessened discount would stop all trade-ins except on a basis of profit to the dealer.

Chandler priced the new touring car at \$100 less than its predecessor. Paige advanced the price \$255. Overland made a \$15 cut, Willys-Knight a \$100 reduction. The prices on the new Stephens models are lower than old models in most cases. Auburn also came through with a \$200 reduction. The new prices are given in detail in another column. Last year, it will be recalled, there were many price changes, chiefly reductions, and Dodge added materially to the interest in prices by announcing that prices for the year would not be announced until the Chicago show. There was nothing of that air of mystery about the prices this year.

The show itself is pleasing. The decorations are colorful and make a gay appearance with a substantiality that often is missing in such efforts. The attendance on Saturday did not break any records and some comment was that the crowd was not up to a standard considered desirable. However, a lot of people passed through the doors of the Grand Central Palace and they showed a great deal of interest in what was to be seen. Owing to the open discussion as to the best show dates, there is going to be an especial interest in attendance figures during the week.

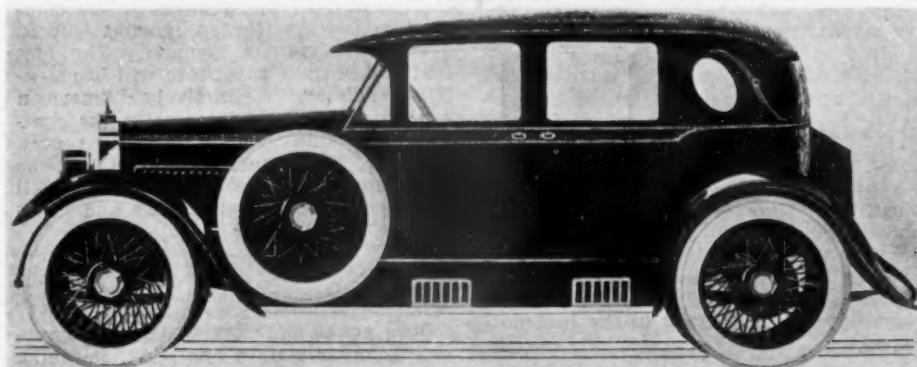
But the cars were not the only interest in this show by any means. There are 81 manufacturers' exhibits, showing 32 cars. This shows a reduction from last year. There are 42 stripped chassis, an increase over previous years. These figures are carried into details on another page.

There are 278 parts, accessory and equipment exhibits, making a total for the exhibit booths in the show of 359.

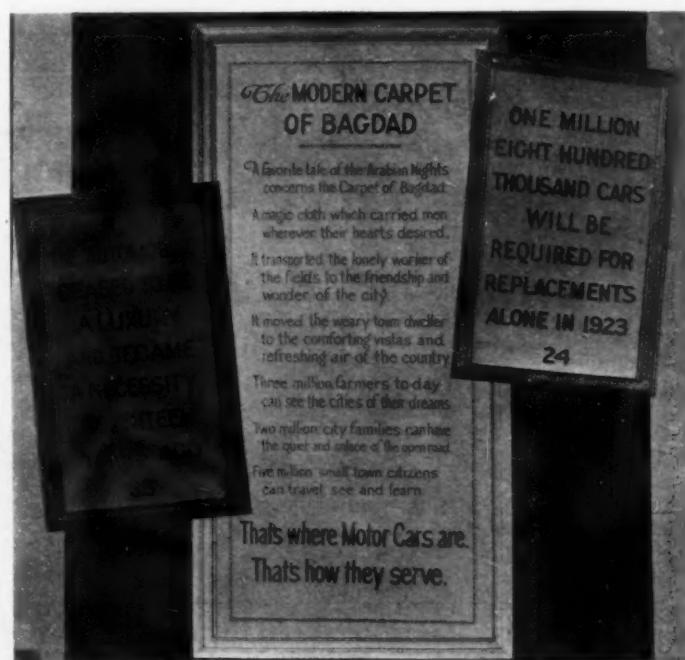
And the accessories, parts and equipment are proving of a very high interest value to the show. It appears to the casual observer that the visitors give even more time to these exhibits than to the completed vehicles. Many of these are of a highly educational nature and the visitors apparently get more satisfaction in studying the design of an axle in a parts maker's booth than in the stripped and cut out chassis.

It is notable that there are fewer freak exhibits than in former years. There is little question that as the industry gets more settled and the worth of its product is more and more defined that the adventurer of former years is more careful in attracting attention to some fancied improvement. Then, too, even the dreamer is more and more impressed by the requirement of a considerable bank account or credit before he attempts to enter the competition that he knows that he must meet.

On the upper floors of the show there was a mass of bright colored merchandise for the attention of the public and scores of these booths have well defined action in their exhibits. The lamp booths, with the smaller lamps lighted, are attractive and many stop to comment on the improvement made in the styles in his line. Listening to the comments of the people as they pass these booths, one cannot help being impressed with the fact that the public is getting down to details in car styles and that an improvement in design and performance of the "trimmings" are fully appreciated.



This cotton fabric covered body was announced at the show as a production possibility



These striking placards, artistically displayed, brought home in telling manner some of the merchandising possibilities of 1923

While the show itself presented a more varied and widespread interest than ever, the old timers noted that the picturesque outside display had practically ceased to exist. All who have attended more than a dozen shows can recall the curious exhibits in the streets near the exposition, where all sorts of queer inventions were bidding for interest, usually in the hope of finding some one to finance an adventure. But no more.

All of these things serve to bring to attention the quick development of the automotive industry from an adventure of only a few years ago. This adds interest to the historical pictures printed in Motor Age of last week. There are scores of men here who have attended all of the shows and so it is easily within the memory of a man that this giant of industries has been built. This is well reflected in the newspaper stories on the opening of the show. They do not tell of wonderful performances in the way of travel during the past year, they have little to say of any freaks, but they reflect in many ways that the automotive interests have been whipped into a great and solid industry.

The side issue exhibits are not attracting as much attention from the early visitors as in years past. There is to be an overflow show in Madison Square Garden where shows were housed in former years, but there was a dance in this great hall on Saturday night and the automotive exhibits could not be moved in until late Sunday. It remains to be seen what will develop there.

The hotel exhibits were in a measure duplicates of the show exhibits on the part of those manufacturers who wanted a wider bid to the public. The Stutz and National lines, both in the show, had considerable space at the Commodore hotel, where also the Flint car, the new Durant vehicle, was shown. Here, also, as in previous years, was the Fox air cooled car.

A high interest was shown in another Commodore exhibit, that of the Meritas fabric. This was a decided novelty, in that it is a fabric covered body that is offered as a production job. This is a new fabric made of laminated cotton cloth treated in a way as to give it the appearance of leather, oil cloth or satin cloth and sold at a much less price than these former trim and upholstery materials. The body shown was designed by

George J. Mercer of the Model Body Corp. The exhibit was in charge of K. L. Childs of the Standard Textile Co., who is behind this effort to bring about a change in production body possibilities.

At the Pennsylvania Hotel, where the Dodge party holds forth as in former years, there was a handsome display of special bodies built on Dodge chassis and the National was showing still more cars at the Waldorf.

There was another contrast with last year in the number of notables of the industry present the opening day. In fact, notables were most notable for the word handed out that they would be here Monday. Last year there was quite a sprinkling of well known manufacturers, engineers and dealers at the show the first day. They were anxious to see the drift of things and to be on hand for any emergency decisions that were needed.

All of this feeling that "something might happen" appears to be replaced by confidence and the manufacturer and others are staying at home until the first of the week when they will come for the multitude of meetings that are announced. There are, of course, the Society of Automotive Engineers' sessions, which are becoming broader in their scope each year, then the National Automobile Chamber of Commerce meetings which are taking on added interest.

The most numerous of functions will be the dealers' meetings. There will be many of these and at some of them important announcements are to be made. These announcements concern added details of sales plans, the presentation of new car details and the general pepping up of the men who are on the firing line. It is going to be a busy week. Incidentally, it is very interesting to note that the manufacturer is apparently taking his dealer much more seriously than ever before. Already there are indications that more than ever before the dealer meetings will take on a different tone, in that they will be more of a mutual interest than of "here is the job we have laid out for you, now get busy and do it."

Incidentally, this show follows closely the close of the biggest year the industry ever had. There is an impression that this record has been achieved without as much support from the farm buyer as is normal. There is a belief that the farmer will buy heavily this year and that he will be one of the



Here lies ahead the entrancing vision of what 1923 holds for the seller and user of motor vehicles

main props in another very large year. It was rather cheering to hear during the show that the 1922 registration shot up to 12,350,000 automotive vehicles, marking an unprecedented gain of 1,851,716 over the year previous. The production for the year was 2,557,000 cars and trucks, which does not account for such a gain after the export and junked cars are counted out. There can be but one conclusion, and that is that during the rather lean times of 1921 a good many cars were not in use and that when better times came in 1922 these were again brought into use. This would appear to bear out the recent conclusion that the dealer stocks of used cars are less than a year ago.

And so, after looking over the field from the various points of view, the early conclusion of those gathered for the opening of the show season is that the industry is set for another big year.

23 Years Ago This Week In MOTOR AGE

(From MOTOR AGE of Jan. 11, 1900.)

How Cars Were Advertised

(The following is from a full-page advertisement of the Elgin Automobile Co.—not related to a later company bearing the name Elgin—which had a factory at Elgin, Ill., and offices in Chicago.)

The Winner Gasoline Runabout is guaranteed to be absolutely safe and can be operated by anyone. Two gallons of gasoline will run the wagon 15 hours at an average speed of 8 miles per hour. No odor and practically noiseless. Variable speed of 4 to 15 miles an hour. Total weight, 700 pounds. Price, \$675. With 3-bow top and apron, \$725. When desired we will send an expert operator with the wagon to thoroughly demon-

strate it, for his expenses to the point of shipment and return. Terms, NET CASH.

Autos Defy the Snow

BOSTON, Jan. 6—Everybody waited with interest for the first tussle of the electric cabs with the snow. There has been much prejudice here since last winter against horseless vehicles when confronted with a snow storm, because one of R. H. White's delivery wagons was stalled one day last winter for several hours on Winter street, a target for the jibes of the conservatives. The first snow this winter fell this week to the depth of eight inches, during a very cold period. The horse cabbies thought they had the laugh on the "doughnut wagons," as they facetiously term the new cabs, but while their horses floundered about in the snow, the electric cabs whizzed merrily about gathering in the half dollars.

Progress at Detroit

DETROIT, Jan. 7—The Detroit Automobile Co. has about completed a deliv-

ery wagon for the use of one of the largest stores in the city, and expects to have it running in the course of a few days.

Notes of Interest

A. L. Riker, Alexander Winton and C. E. Woods have been named as the three representatives of America in the competition for the Gordon Bennett Cup in France the coming summer. The fact that two of the competitors will use electric vehicles, distinctively American products, will lend interest to the competition. One cannot fail to regret, however, that America should not be represented by a steam vehicle as well as those driven by electricity and gasoline.

Another Ad

(A gong for automobiles was described in an advertisement as follows:)

Two gongs, differing in tone. Depressing plunger strikes one gong, releasing it strikes the other, thus producing a chime peculiarly distinct and noticeable—different from any other alarm ever heard.

Statistical Picture of Eleven New York Shows

EXHIBITORS AND EXHIBITS

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Total Exhibitors	424	349	317	319	323	331	198	307	307	337	356
Total Car Exhibitors	.....	.....	.....	.....	.....	.....	.....	.....	86	87	78
Total Accessory Exhibitors	320	259	223	306	227	252	141	225	221	250	278
Number of Gasoline Car Exhibitors	.....	.....	.....	.....	.....	.....	.....	.....	3	3	1
Number of Electric Car Exhibitors	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Number of Steam Car Exhibitors	.....	.....	.....	.....	.....	.....	.....	.....	83	83	76
Total No. of Vehicles Exhibited	276	269	228	264	282	263	225	334	341	310	325
Total No. of Gasoline Cars Exhibited	226	265	221	251	272	252	223	324	334	302	278
Total No. of Steam Cars Exhibited	.....	.....	.....	.....	2	4	.....	2	1	2	2
Total No. of Electric Cars Exhibited	10	4	7	13	10	11	2	8	7	6	3
Total No. of Stripped Chassis Exhibited	49	37	51	56	54	34	.....	.....	35	36	42

BODY STYLES (Gasoline and Steam Cars Only)

Open Cars	213	195	175	194	195	175	127	176	163	158	127
2-3 Passenger	52	51	51	76	68	40	.....	.....	40	29	14
4-5 Passenger	164	145	129	125	140	143	.....	.....	91	102	92
6-7 Passenger	164	145	129	125	140	143	.....	.....	32	27	21
Closed Cars	53	43	36	28	37	77	79	119	120	149	155
2-3 Passenger	19	17	7	6	6	13	.....	.....	23	37	19
4-5 Passenger	2	2	3	2	.....	43	.....	.....	80	80	101
6-7 Passenger	23	16	19	14	19	8	.....	.....	27	32	35

ENGINE CHARACTERISTICS (Gasoline Cars Only)

Water Cooled	261	258	218	248	.....	.....	.....	.....	325	318	315
Air Cooled	5	6	3	3	.....	.....	.....	.....	7	8	6
Four-Cylinder	329	183	146	158	146	94	40	65	80	84	83
Six-Cylinder	133	131	160	154	161	171	141	223	213	204	199
Eight-Cylinder	.....	8	50	55	40	34	29	31	41	37	.....
Twelve-Cylinder	.....	.....	17	16	9	8	7	3	2	1	.....
Poppet Valves	215	254	213	347	270	252	.....	.....	321	319	307
Sleeve Valve	10	10	5	15	2	.....	.....	.....	12	8	12
Revolving Disk Valve	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1
"L" Head	.....	.....	.....	.....	.....	.....	.....	.....	180	206	209
"T" Head	.....	.....	.....	.....	.....	.....	.....	.....	29	15	12
Valves in Head	.....	.....	.....	.....	.....	.....	.....	.....	119	86	83
Valves in Head and Side	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16

WHEELS (All Cars)

Artillery	.....	.....	.....	.....	.....	.....	.....	.....	215	229	235
Wire	.....	.....	.....	.....	.....	.....	.....	.....	70	67	21
Disk	.....	.....	.....	.....	.....	.....	.....	.....	56	37	71

New Reflector in Lamps on Oldsmobile

A new entirely new type headlight glass and reflector so designed that no special lenses are necessary has been adopted by the Olds Motor Works and is standard equipment on all models of the Oldsmobile. The reflector is so corrugated that the light beams are thrown directly down to the road level. The glass in the headlights is plain window glass. The claim is that the plain glass does not diffuse the light rays, which can be transmitted directly to the road. The company states that the highway department of every state in the Union has passed the reflector.



A close-up of the new corrugated reflector on the Oldsmobile. Plain glass is used for the lens.

New Cadillac Landau Sedan

THE landau sedan is the latest addition to the Cadillac line of closed cars. This new body model, however, is not on display at the show. The last price is \$3950. It has the general lines of a sedan landauette although the top is not collapsible.

Maxwell Traveler Shown Later

MAXWELL is showing its standard line of cars which are familiar to the trade. A new model which is not at the show, however, but which will be on exhibition at the salesroom later in the week is the Traveler. This is a custom sedan painted in Ditzler's green gray and listing for \$1635, f.o.b. factory.

Engine Design Indicates Strongly Influence of Service Considerations

Excellently Designed Engine Found on Moderately Priced Cars — Front End Drive Given Much Thought

By A. LUDLOW CLAYDEN

ENGINE design indicates strongly the influence of service considerations at the show. In the engines exhibited at New York there are extremely few novelties in the line of detail design but it is most striking and significant that salesmen are laying great stress on the reliability rather than upon the performance of the engine in their particular product.

Of course, there are advances in design. The few entirely new jobs are well ahead of the average excellence in engineering and a particularly impressive thing is that these new engines are found on moderate priced cars; cars to be produced in quantities that make the service problem vitally important. Of course some of the highest priced cars have a reliability and a durability of a high order, but when they do finally have to be overhauled—oh, what a job.

Accessibility a Feature on Moderately Priced Cars

On the contrary, the more recent cars of moderate price seek reliability by the employment of an essentially simple design with special attention to the vital details; and the arrangement of engine accessories, controls and so on is such that tearing down and re-assembly is as easy as possible.

Very much more attention is being given to lubrication, to the dimensions and the materials of bearings, to the proportions and ring fitting of pistons; unquestionably results of troubles from oil dilution and from the fact that the present day small engines are driven much harder proportionally than the motors of a few years back.

A particularly striking example of this form of detail advance is the Falls engine used on the Dort six and the Handley. The basis is a simple and inexpensive overhead valve layout differing but little at first glance from the Northway miniature six of 1918. The latter had two admitted faults, liability to become noisy if the valves were not attended to fairly often and an exceptional carbon forming tendency.

Improvement Seen In Overhead Valve Design

The valve difficulty was due to two causes—insufficient lubrication of the rocker mechanism and that the compactness of the design made it hard to get water close enough to the exhaust valves to keep them properly cooled when run-

ning wide open. The carbon tendency was caused by the use of a high pressure oiling system which did take care of bearing wear remarkably well but overoiled the cylinders.

To maintain the quietness of the simple rocker operated overhead valve, the new Falls engine supplies oil direct to the hollow rocker shaft, through each rocker to the push rod head, down hollow push rods to the inside of hollow cylindrical tappets and through a small hole in each mushroom tappet head back to the crankcase. This lubricates every point in the valve system except the contact of valve stem and outer end of rocker.

This is a small engine $3\frac{1}{8}$ by $4\frac{1}{2}$ in. and to give adequate performance must be capable of sustaining high speed. Hence, a rapid flow of oil is needed, calling for a high pressure, but to prevent this high pressure from flooding the cylinders, a double precaution is taken. First the crankpins are drilled radially inward instead of outward, so that the centrifugal pumping effect of the shaft itself is a minimum; second, the oil release valve is double; the inner member blows off at a set pressure, while the outer member is controlled by a link from the throttle and gives practically no pressure at idling.

Thus we have a carefully drilled crankshaft, drilled rockers, hollow push rods and a fairly elaborate oil release valve of which the sole purpose is to maintain the performance of the motor as a similar system would work well in a new engine.

Sustained Performance Assured in New Cars

Oakland, starting from a similar basis, have tackled the same problem in a slightly different way, preferring to prevent over lubrication by the use of special pistons and piston ring equipment; nor is the Oakland a novelty at this present exhibition. But what is it that the Oakland salesmen are saying in describing the sectional engine? "We guarantee these crankshaft bearings for 40,000 miles, these pistons and rings for 15,000 miles." It is not the new performance but the permanence of that performance that is their point.

Take another case at random—the R and V Knight sixes are all shipped with a steel band right around crankcase and cylinder block, sealed so that it cannot be detached. The heads cannot be re-

moved, nor the oilpan dropped nor any essential internal part even seen without breaking the seal. That it should remain unbroken is a condition of a two-year guarantee. Any R and V which needs even carbon removal under that period will be serviced by the makers provided it is taken to one of their stations with the sealed band unbroken.

This is an entirely new sales psychology and it should be welcomed by every engineer worthy of the name. The best possible salesman is the satisfied owner who has run the same machine for several years. This has long been appreciated by high priced car manufacturers but has been much neglected by others. If the present condition persists, as it almost surely will, then there is going to be as high a professional satisfaction in producing an inexpensive chassis.

Where Appearance Yields to Accessibility

Of course, neatness of design is always improving and the service viewpoint encourages this, too, for neatness and accessibility generally go together. This is not invariably true, however. For instance, there is quite a noticeable tendency back toward some external oil piping, and to oil pumps that are partially external. For example, the new Chandler where the pump is wholly outside the crankcase and easily removable, but so placed that it does not interfere with the accessibility of anything else.

The things most frequently done to an engine are the removal of carbon and the grinding of valves. Both these jobs should require a minimum of disturbance of other parts than the cylinder heads and the valve springs, and on a majority of engines in the show, controls and piping are so arranged that they do not interfere with these operations.

Developments Seen In Heated Intakes

The handling of fuel now almost invariably involves an exhaust heated surface and the variety in idea is far too great to be gone into in such a general review as this. The Chandler, one of the few entirely new designs, has an unusual feature in that an adjustment; or rather, a setting, is provided. At the center of the exhaust manifold is a horizontal flange closed by a square plate.

This plate has a tongue projecting into the exhaust passage. When set one way

the tongue obstructs the main exhaust line and diverts the exhaust from the four rearmost cylinders around a jacket encircling the carburetor outlet. By removing four capscrews and turning the plate through a right angle, the tongue ceases to obstruct the main line and the intake jacket is then in parallel with the four rear cylinders instead of being in series. This gives a summer and winter setting which the owner can use if he has the necessary mechanical intelligence.

The R and V Knight has another new system which is quite different in principle though similar in effect. Exhaust is taken across the cylinder block to an intake jacket and thence through a long outlet pipe. This jacket is always hot, but in passing across the block the same portion of the exhaust also preheats the carburetor air which also comes across the motor through a passage parallel to and in contact with the exhaust passage.

At the intake end of this air inlet is a spring controlled door which can be set either open or shut by lifting the hood and pressing a small lever, so that

either hot or cold air can be admitted. It is obvious that the work of Midgley, Ricardo and others who have contributed so much to recent knowledge of combustion is being appreciated. This is shown in the manifolds by much better proportioning and combustion chamber shape is also just beginning to get the attention it deserves.

Again, instance the Chandler which has a flat head L cylinder with the piston almost touching at top stroke and nearly all the compression space in an arched pocket above the valves.

Front End Chain Adjustments

Front ends have had more attention than ever before. First, the proper application of the Link Belt automatic tightener and of the Morse hand operated adjustment has greatly improved chain layouts and brought their average much nearer what has long been known to be the ideal for chain constructions.

Second, non-resonant gear materials have improved in quality and increased in number of sources of supply. It has use the dead material for the camshaft

been past practice almost invariably to gear with steel or cast iron for the crankshaft and generator pinions.

In a few modern engines this system is reversed, there being a cast iron cam-shaft gear with non-resonant pinions. It is claimed that this improves the quietness and the theory is logical since most of the resonant noises of a front end start from crankshaft irregularities of running. A review of this sort, however brief, would be incomplete without some mention of the Chevrolet "Copper Cooled" car, which makes its initial appearance after being so long expected.

This chassis is only to be regarded as an experiment in public taste. It is no longer experimental in any engineering sense; it simply remains to be seen whether its advantages offset its abnormality enough to create a lasting demand on an adequate scale. Its coming is important because it is the first low priced air cooled car sponsored by a powerful manufacturing organization. It will be the deciding factor in the question of whether the public does or does not want air cooling.

New Ross Cam and Lever Steering Gear

A cam and lever type steering gear is now being made by the Ross Gear & Tool Co., Lafayette, Ind., which heretofore has made steering gears of the screw and nut type. The small size, powerful leverage, accelerated action in operation, easy operation and simple construction are features of the new gear, the company states.

The actuating member is a cam similar in appearance to a single thread screw of variable pitch, mounted between ball bearings which take both thrust and radial load. The cam is connected by means of a serrated, splined joint with the steering tube, at the upper end of which the steering wheel is attached. When the steering wheel is turned, the cam turns in its bearings. As the cam turns, the diamond stud projection on the inner side of the lever and in contact with the cam, moves up or down, the lever rotating the trunnion shaft, which is pivoted in the sides of the housing.

The lever is a projection from the trunnion shaft. When it rotates, the trunnion shaft and the steering arm at the other end of the shaft rotate and transmit the steering action to the wheels.

As will be noted from the illustration, the cam is machined with a thread of variable pitch. In mid position there is very slight pitch and the motion is slow, but as the pitch increases, the motion increases constantly and rapidly toward either extreme. When the car is driven straight ahead, the low reduction of the gear in mid position practically eliminates all road shock. When rounding a corner, a very little turn of the wheel is required as the ratio becomes con-

stantly faster the further the wheel is turned.

The cam and trunnion shaft are both manufactured from low carbon steel, case hardened. The cam surface and the diamond stud are hard and wear-resisting. The housing is split longitudinally, being assembled with shims to get the proper adjustment of the diamond stud and cam surface. A similar shim construction is provided for perfect adjustment of the ball bearings. The steering arm is attached to the outer end of the trunnion shaft by means of a 36-tooth, V type, serrated, tapered spline.

The steering gear is oil tight and oil



Ease of operation and quick turning characterize this Ross Steering Gear

lubricated. Longitudinal grooves on the sector tube and machined in the lower end of the housing, prevent this tube from rotating and hold the upper spark and throttle control set in stationary position when the steering wheel is turned. These grooves also perform another function in preventing the oil from leaking out of the bottom of the steering gear.

Changes Made in Rotary Six

Some changes in the Bourbomville rotary six have been made since it was shown at the show last year. The solid head sleeve has been changed to an adjustable head with a wedge and shoe. The head is split in two parts for facility of production so that the head can be machined in one setting. The units include Borg & Beck clutch, Brown-Lipe gearset, Columbia axles, Warner steering gear, Bijur starting, lighting and ignition and Stromberg carburetor. The tires are 32x4½ and wheelbase 130 in. Only one body model is being turned out, this being a phaeton priced at \$3,800.

Pilot Makes Chassis Changes and Builds Own Bodies

THE Pilot shows a number of changes, both chassis and body. The engine is a Herschell-Spillman 3½ x 5. The previous engine was of the same make but the bore was ¼ in. less. Hoosier clutch replaces the previous type and the universal joints are now Blood Bros. The bodies are now made by the Pilot Co. and the 7-pass. cars in both the sedan and phaeton are 4 in. longer, this space having been added to the tonneau.

Many New Models Feature Show Opening

*Chassis Makers Have Given Much Attention to Maintenance.
Colors on Bodies Very Bright*

By B. M. IKERT

ONE of the things observed at the show this year is the great attention the makers have given to the complete equipment of their cars, especially on the sport types. Colors also are very bright, greens, reds, blues and yellows being in evidence. Nickel-plated radiators, bumpers and lamps also seem to be the thing this year.

Where chassis are exhibited deeper and more rigid frames are very much in evidence. There also is a tendency to fit more cross members and gussets

are more pronounced. Engine design is cleaner and it is very evident that the plea for more accessible engines and chassis in general has been heeded by the makers.

There are better methods for carrying spare wheels and tires and the trend toward placing trunks at the rear of the sport cars has given rise to the fitting of well designed racks and body protecting rails.

In many instances makers now are fitting the distance type of engine temperature recording devices and

leaving the radiator cap free for the mounting of some decorative figure. Wills-Saint Claire, for instance, fits a reproduction of a goose on its radiator cap.

A casual glance at the chassis seems to indicate that the makers have provided more space around the various chassis units, thus making it vastly easier for the maintenance man to work on such cars. It might be said that the 1923 models should be the easiest to work on, so far as the maintenance man is concerned.

Moon Shows Two New Closed Models

TWO new closed models are fitted to the Moon 658 chassis, these being a petit touring sedan and a suburban sedan. The petit sedan is priced at \$2585 and the suburban sedan at \$2685. The suburban sedan has been built with the idea of incorporating features of the old English stage coach and a bright stage coach red is used on the center part of the body and underneath the fenders. A large trunk is fitted to the rear and the

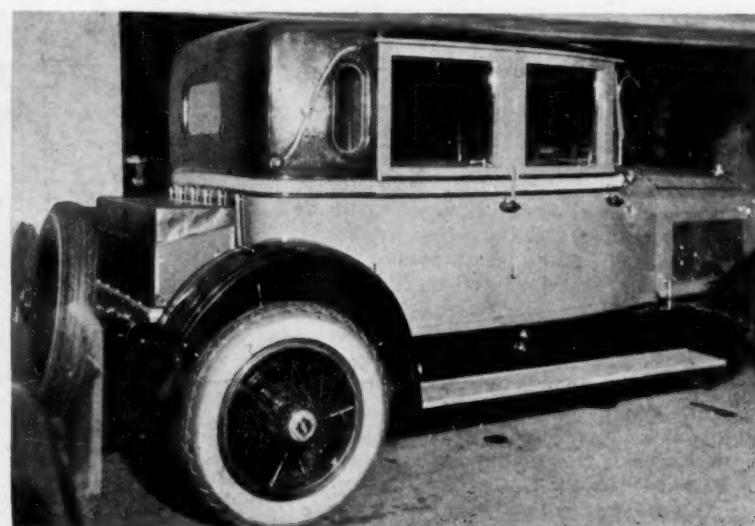
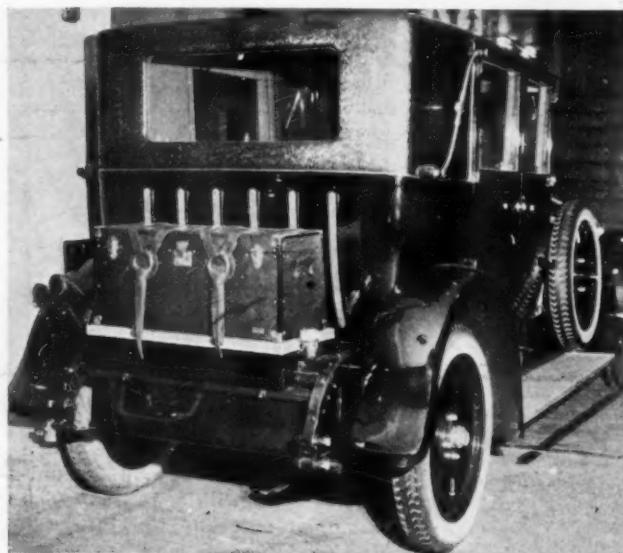
fastening is with saddle cinches. These cinches consist of large iron rings through which the strap is tied with a peculiar knot or cinch, better known to those familiar with horsedrawn vehicles.

Prices remain unchanged on the Moon. Artillery wheels on all models are standard equipment, with steel disk wheels \$35 extra on the model 640 and \$50 extra on the 658. It is stated, however, that practically all orders are coming through for disk wheel equipment, no cars having been sold in the metropolitan district in the last ten months with any other than disk wheel equipment.

Stearns-Knight Six Makes Appearance

THE Stearns-Knight Six which was announced some months back is making its first appearance at a national show. The only mechanical change of note is that Zenith and Stromberg carburetors are now regular equipment. Two new body jobs are displayed, a convertible coupe at \$3150 and a sport sedan at \$3700.

The convertible coupe is painted a light blue with black and gold trimmings. There are two panels of trapezoidal



At left is shown the Moon suburban sedan equipped with trunk securely strapped on. At right, one of the enclosed models of the new 6-cylinder Stearns-Knight

shape on the top of the hood. These panels are formed by a narrow pressed molding which is emphasized by the black and gold trimming. The upholstery is brown leather and the top is collapsible. The rear deck is unusually high and contains a capacious rumble seat for two passengers. Body guard bars cover portion of the top of the rear deck.

The sport sedan has the appearance of a sedan landaulet. The body is gray and the top is black. There is a light tan cane belt around the body. The fenders and running gear are black and the wire wheels are red. The upholstery is cloth. Trunk and trunk rack at the rear and sun visor are regular equipment. Headlamps and radiator shell are nickel.

Willys-Knight Shows Coupe-Sedan

A NEW closed body, known as the coupe-sedan, is shown for the first time in the Willys-Knight exhibit. It has four doors but is shorter than the sedan, although of five passenger capacity. The price is \$1595. Equipment includes a large trunk with a waterproof cover mounted on the rear and the body is so built that the front windows lower entirely out of sight, giving the car a long touring line.

Mechanically there is little change in the new line. The chassis has been strengthened by the addition of a flange, a tubular cross member at the front end of the frame. Another change is the lengthening of the steering tube to reach the floor instead of cutting it off short just below the dashboard.

All Willys-Knight models are now regularly furnished with nickel plated radiator shells, nickel plated barrel type headlamps, nickel plated kick plates on the runningboard and nickel plated ornamental radiator caps. The top on the phaeton is an entirely new type with one of the braces removed to give a better visibility and convenience. The lining is in whipcord. The gasoline tank has been increased in size from 12 to 16 gallons and the tire holder has been strengthened.

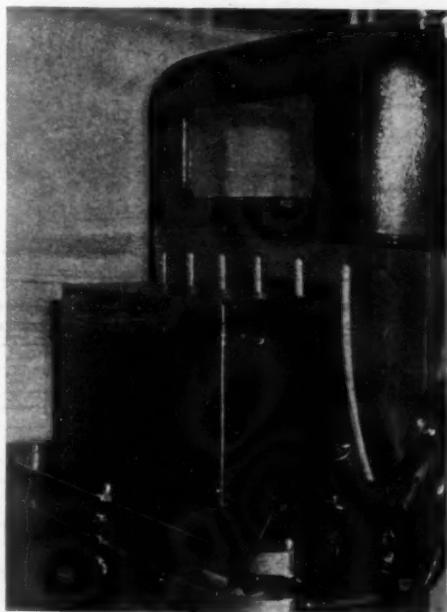
A number of price reductions are also announced at the show. The sedan now selling for \$1795 instead of \$1950; five-passenger for \$1695 instead of \$1795; seven-passenger coupe \$1995 instead of \$2195. The open bodies remain at their former prices.

Mitchell Makes Minor Refinements

THE Mitchell F-50 is continued with some minor refinements in the chassis. Ball bearings are now used on the rear wheels instead of roller bearings. The radiator has been made higher and of a somewhat different shape and the hood has been altered to conform to these other changes.

Chalmers Shows Re-designed Line

THREE new bodies have been added to the Chalmers line and the chassis has been redesigned in a number of particulars. The new bodies include a sedan, sport touring and roadster coupe. The new sedan calls for \$2095. It is mounted on a 122-in. chassis and is equipped



Rear of new Chalmers sedan with soft top

ped with bumpers, trunk and rack, extra tire and extra disk wheel and is upholstered in mohair velvet. Although classed as a five-passenger model, there are two auxiliary seats providing additional seating accommodation for seven passengers if desired. The sport car sells for \$1445. It is equipped with nickel radiator, nickel lamps, two bumpers, trunk and rack, khaki top, extra tire and wheel.

The chassis units are revised to make a stronger frame and to improve the performance. There is a new intake manifold with improved hotspot arrangement and small detail changes throughout the chassis.

Overland Discloses New Line

THE new Overland line, shown to the public for the first time at the show is called Model 91. The same chassis, power plant and parts are used as in the Model Four but there have been a number of detailed changes, principally in the body arrangement, hood and radiator. The most noticeable change is in the raising of the radiator $1\frac{1}{2}$ in., the raising of the hood and the change in the cowl which is now brought up practically to a straight line with no noticeable curve. This, together with the elimination of the beads and the change in other curves gives a real stream line body.

The phaeton has larger rear window

lights so that they are really of service to the driver. The seats have been lowered and there is more leg room in both front and rear compartments. The doors are wider than before and it is possible to get into the driving compartment from the left side of the car without crowding. The changes noted in the phaeton are also incorporated into the roadster.

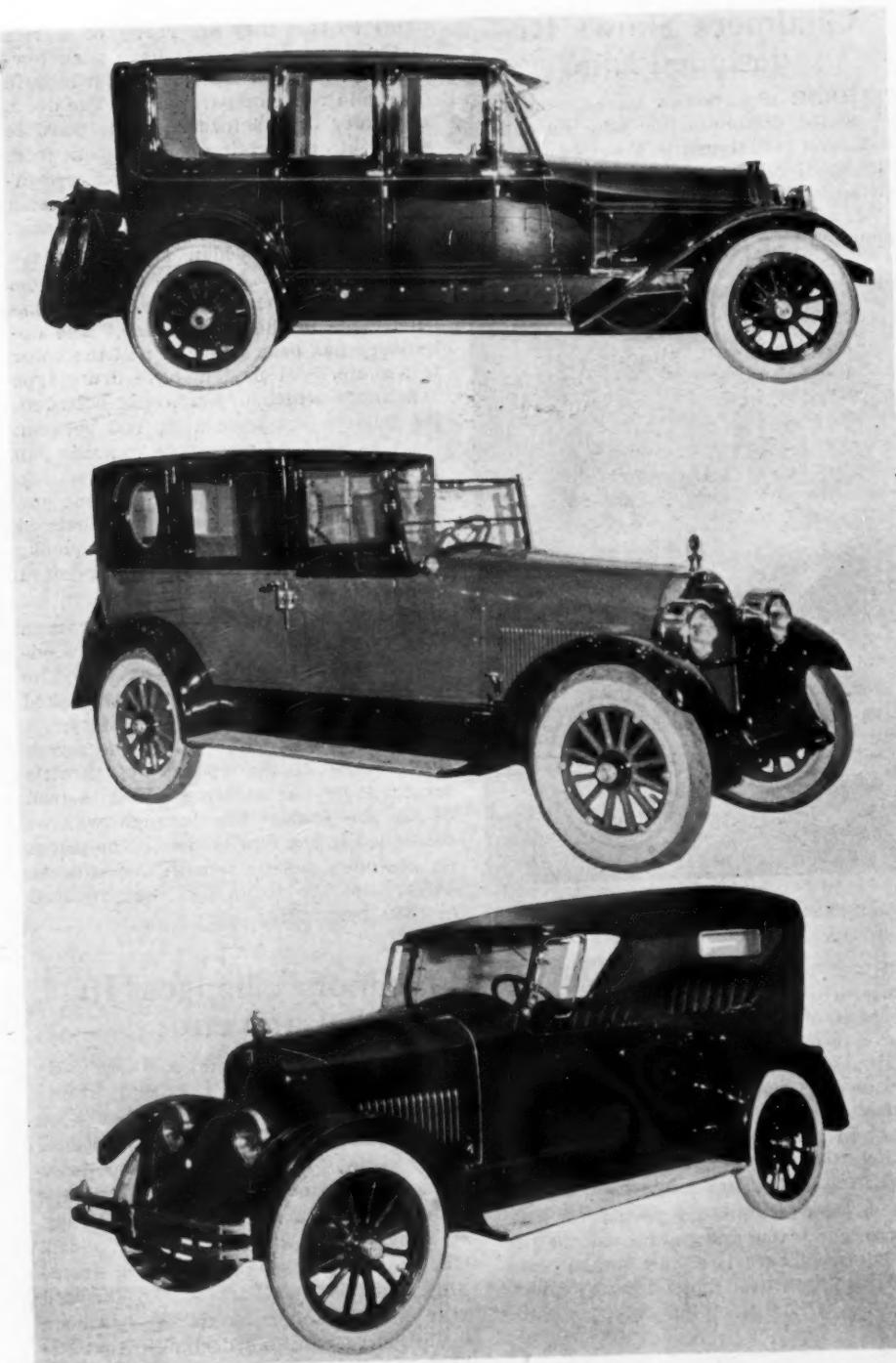
The Model 91 sedan and coupe have the same radiator, hood and cowl changes and in addition many improvements have been made in the car interior. The upholstery has been changed and the color is a slate. All models have drum type headlamps which are not only bolted to the fenders but have a tie rod between them as well. A new type radiator cap also improves the appearance of the line. The front splasher and front end of the fenders have been slightly changed to eliminate rumbles and anti-squeaks have been added to the running-board splasher, body and frame.

All bodies are bigger and wider than before. The top and clear vision windshields have been lowered 2 in. The phaeton body is all steel with baked enamel and detachable upholstery. A change that was made some time ago is the placing of the spark and throttle levers under the steering wheel instead of on the dash. This change will be continued in the new models. The prices on the open models remain the same as before, but the sedan has been reduced to \$860 from \$875.

Minor Changes In Lafayette

MINOR chassis changes and new body styles are being shown at the Lafayette exhibit. A change has been made in the springs, some of the leaves being made of electro-chrome-silico-manganese steel to give strength and the others of carbon steel to give resiliency. Rebound plates have also been added. There is a new channel section frame cross member just aft of the forward rear spring hanger. A change has been made in the manifold design so that the amount of heat supplied by the exhaust gases may be regulated. A new type of Morse front end chain is used which requires no adjustment and consequently this feature has been eliminated. The pistons are now fitted with four rings instead of three. The accelerator is now of the lever pedal type.

A new phaeton listing at \$4300 is on display. It is painted a maroon with a narrow bright red panel extending around the back of the rear seat at the top. Outside door hinges help to give a custom appearance. A four-door, four-passenger closed coupled sedan job is also shown. The price on this is \$5500. The body is gray with black top and red running gear. This model has a novel built-in luggage compartment which imitates the appearance of a trunk. Brewster type windshields are being used on the sedans.



From the top down: A Suburban Sedan is one of the new Locomobile models. Peerless shows Opera Brougham in two-color body. A permanent top features the new 6-cylinder Apperson

Locomobile Exhibit Consists of Four Cars

THE Locomobile display consists of four cars together with a polished chassis. One of these is a sedan model called the suburban sedan, priced at \$11,000, which is said to be the highest price carried by any car at the show. It is finished in light green with black stripe and two hairlines of white. It is upholstered in broadcloth. The driving compartment is finished in long grain black leather. The other cars are a limousine in maroon with a black and gold stripe, a black cabriolet with nickel fittings and gold hairline striping and a four-passenger sport type, open model. This is painted in green with black fen-

ders, natural wood wheels, and nickel-trimmed head lamps.

Peerless Opera Brougham

PEERLESS is showing a new closed body on its standard chassis. This is the opera brougham selling for \$4900. The lower portion of the body is painted in a medium shade blue with the upper portion in black. It is a chauffeur driven type somewhat along landauet lines with the driving compartment open and upholstered in leather. The interior is completely equipped with all of the usual town car fittings including a telephone to the chauffeur.

Apperson Revises Eight and Brings Out New Six

THE Apperson eight-cylinder line is augmented by the addition of an entirely new six. A great number of refinements are made in the eight and many of the changes shown are also incorporated in the design of the six. Probably the most interesting feature is the use of a mechanical pre-selective gearshift operated by a small lever on the steering wheel and the mounting of the emergency brake on the dash, operating through a pull rod. This leaves the driver's compartment entirely free of levers. In fact there is no more trouble sliding across the front seat than across the rear seat. This feature is used on both chassis. Apperson calls it a leverless gearshift.

The engine of the new six is $3\frac{1}{8} \times 4\frac{1}{2}$ with overhead valves. For the present it is being manufactured for the Apperson company. All moving parts operate in a bath of oil and the oil intake is on the top of the valve cover. Circulation of the oil keeps these parts fairly lubricated. Starting, lighting and ignition is by Remy and cooling is by thermo-syphon. The clutch and gearset form a unit plant with the engine. The rear axle is a Timken, semi-floating type with a gear reduction of 4 to 1. Tires are 32 x 4. The equipment include bumper, windshield wings, stop signal, extra tire and tube and rim.

A feature of the six-cylinder phaeton is the use of a permanent top. This type of top is now also used on the eight-cylinder phaeton. It has a step and recess with the curtains fitted to the inside. The fastening to the body is unusually strong and a heavy nickel-plated strip completes the fastening at the forward end of the gypsy curtain.

The equipment of the eight-cylinder models have been more completely carried out. These include an automatic windshield wiper, two spare wheels with tires, tubes and covers, rear view mirrors and, on the open cars, windshield wings which are built into the windshield and not added as an accessory.

All upholstery is of the farm fitting type, the open models being in full French grained leather and the closed models in broadcloth. The door checks instead of being of the strap type are silent chains. The sun visors, which are standard equipment on all models, are adjustable and are covered with top material to match the top. The windshield on the open models is of the one-piece type and a cowl ventilator provides ventilation for the front compartment. Closed models are fitted with a two-piece windshield.

Prices on the 8-cylinder models have been increased. Following are the new prices:

	New price	Old price
5-pass. phaeton	\$2,800	\$2,620
7-pass. phaeton	2,900	2,645
5-pass. sedan	3,750	3,695
7-pass. sedan	3,850	—
4-pass. special coupe	4,000	3,625

New Low Priced Premier Four

PREMIER, which has previously been known as a high priced car is now in the low priced field and is showing for the first time the four-cylinder Stratton-Premier. Previously the Premiers have been sixes and the six-cylinder line will be continued. The following body styles and prices are available in the four-cylinder line.

2-passenger roadster	\$575
5-passenger roadster	595
2-passenger coupe	895
5-passenger sedan	995

The four-cylinder engine used in the new chassis has a bore of 3 in. and a stroke of 4½ in. It is an L head type with the valves on the left side and is claimed to develop 23 hp. at 220 r.p.m. The power plant is a unit, mounted at three points. The cylinders are cast in block with a detachable head and a barrel type crankcase. The crankcase is open at the bottom with a heavy pressed steel oil pan with a reinforcing flange around the top forming the seal and also permitting access to the interior bearings. The pistons are semi steel with the rings above the wrist pin. There is an oil collecting groove below the bottom ring which drains to the piston pin, lubricating that member.

The piston pins are clamped in the upper end of the I beam connecting rod. The crankshaft is a .40 carbon steel unit carried on two annular ball bearings with ½ in. balls. The valves are driven through a helical timing gearset with 1 in. face gears, 1½ in. diameter cam-shaft carried on three cast iron bearings through mushroom tappets. The valves are steel stem with cast iron heads set on an angle so that the piston at the top of the stroke is just level with the valve port. Cooling is by thermo-syphon. Electrical equipment is Auto-Lite and the carburetor a Zenith.

The drive is taken through a multiple disk Covert clutch, three speed Covert transmission, two fabric universals to the semi-floating rear axle. The frame is pressed steel 4½ in. in depth of ½ in. stock. The springs are reversed quarter elliptic cantilever, placed parallel to the frame side rails. The front are 33 x 1¼ in. and the rear 50 x 2 in. The main leaves are chrome vanadium steel and the remaining leaves carbon steel. Owing to the unusual spring mounting, it is plain that a 138 in. spring base is obtained although the wheelbase is 102 in. The length of the frame overall is 145 in. The tires are 30 x 3½ in. The wheels are Dayton wood disk. All models have individual steps and fenders and a speedometer and ignition lock are regular equipment.

Mercer Shows New Sixes

THE Mercer six-cylinder line, which was announced last fall, is exhibited for the first time. No changes have been made since that time. A new sport sedan has been added to the line but it is not

displayed at the show. It is a four-door close coupled job listing at \$4700. It is painted a light blue with dark blue beading and superstructure. The drum headlights and the radiator shell are nickelized. The upholstery is blue cloth. There is a trunk rack at the rear and polished body guard bars are installed.

Nash Shows Two New Bodies

TWO new model bodies are being shown by Nash. One a close-coupled sedan which will be known as a four-door coupe on the six-cylinder chassis and the other a sport model on the four-cylinder chassis. The prices on the carried over models remain as they were. The new four-door coupe on the six-cylinder chassis will have its price set during the show, and the sport phaeton on the four sells for \$1195.

The six-cylinder four-door coupe is finished in maroon, with running gears, fenders and wheel toned in deep black. Five disk wheels, with tire cover for the fifth wheel, are standard equipment. There is a trunk and trunk rack at the rear and the body is protected by guards. The upholstery is mohair and there is a vanity case mounted on one side of the rear seat and a smoking set on the opposite side. Interior equipment includes a vase, dome light and reading lamps in either corner. In addition there is a heater, robe rail, foot rest and windshield wiper.

The four-cylinder sport job has an ecru silk mohair top. There are nickel bumpers, front and rear, trunk with weather-proof cover, trunk rack including guard bars on the rear of the body and five disk wheels. The extra nickel wheel is equipped with a cord tire and tire cover. The windshield posts are nickel plated and regular equipment includes windshield wings, nickel trimmed headlights and cowl lamps, nickelized motometer and locking type monogrammed radiator cap. The upholstery is Spanish leather.

Kissel 6-Cylinder Model at Show for First Time

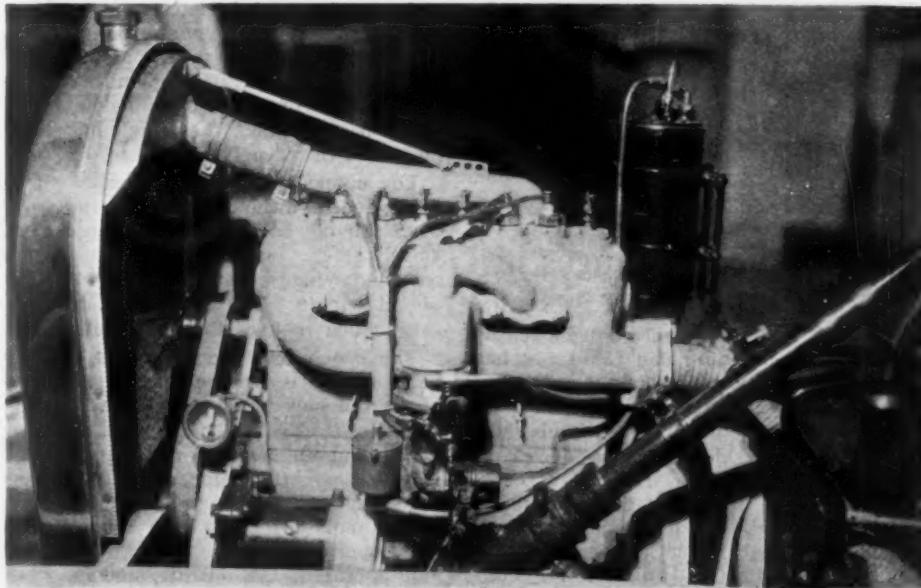
THE new Kissel six-cylinder model is shown for the first time at the show. This model is furnished in four body styles at the following prices:

5-passenger phaeton	\$1485
5-passenger sport phaeton	1685
Sedan	2285
Brougham-sedan (four-door type)	2585

The cylinders are block cast and the bore and stroke are 3 5/16 in. and 5 1/8 in. respectively. The cylinder head is detachable. Cooling water is circulated by centrifugal pump and the rate of flow is controlled by thermostat. Lubrication is by a gear type pump which furnishes oil under pressure to the main bearings. Stromberg carburetor, Remy starting, lighting and ignition, Stewart vacuum system and Willard battery are regular equipment.

The clutch is a multiple dry disk and the gearset provides three speeds forward. The axles are Timken, the rear being a full floating type with a reduction of 4.4 to 1. The springs are semi-elliptic underslung at the rear. Both brakes are on drums on the rear wheels, the service brake being of the contracting type and the emergency of the expanding type. The wheelbase is 121 in. and the tires are 32x4 1/2 in. on all models except the phaeton which carries 32x4 in. tires. Wood wheels are standard equipment.

The phaeton is furnished in either Brewster green or maroon with black leather upholstery. The sport phaeton is finished in Rolls Royce blue with blue leather upholstery. The brougham sedan is Holland blue with mohair plush upholstery. Trunk rack and body bars are regular equipment on phaeton but trunk is not furnished. Spare tires are carried at the side forward of the front door which results in the use of three-quarter length runningboards.



Power plant of the new low priced 4-cylinder Premier



The new 6-cylinder Hatfield shows this handsomely appointed sport model

Hatfield Shows a New 6-Cyl. Chassis

HATFIELD is now building a 6-cyl. model, the first three completed models of which are exhibited at the show. This model is known as the 655. The 4-cyl. line is continued without change. All coach work on both 4- and 6-cyl. models is done at the Hatfield factory. The new 6-cyl. line includes the following bodies:

Model D-55 5-pass. sedan.....	\$2275
Model D-55 4-pass. coupe.....	2175
Model A-55 5-pass. sportster.....	1975
Model Cs-55 4-pass. sportster.....	1925
Model n-55 5-pass. phaeton.....	1775

The engine is a Herschell-Spillman, 6-cyl. unit, $3\frac{1}{4} \times 5$ in. It has aluminum pistons, is 3-point suspended and of the unit power plant type. Water circulation is by a centrifugal pump and the radiator is of the cellular type assisted by a ball-bearing mounted fan with eccentric belt adjustment. Equipment includes Stromberg carburetor, Bosch starting, lighting and ignition, Borg & Beck clutch, with 10-in. disk, Durstin gearset, Spencer universal joints and propeller shafts, Columbia front and rear axle, the latter being of the full floating type, Sheldon springs and Gemmer steering gear. The tires are 32x4 and wheelbase 121 in.

No Radical Changes in Studebaker

HERE are no radical changes in the Studebaker line. The Light Six has a new all-steel phaeton body of increased length. There is also a depressed band extending through the hood and radiator. The windshield is a one-piece construction and the cowl lights are set in the corner of the windshield base. A cowl ventilator, which is operated from the driver's seat, is another feature. The Special Six phaeton is featured by unusually complete equipment including sun visor, automatic windshield cleaner, rear

view mirror, stop light, tonneau lamp with long extension cord and eight-day clock. The Big Six phaeton is also very completely equipped and is furnished with five disk wheels.

All Big Six models are equipped with disk wheels and, with the exception of the Speedster, are finished in blue with black hood, blue wheels and gold striping. The Special and Big Six models have the short type spark and throttle levers without quadrants. The closed bodies on the two larger chassis are very completely equipped. The Light Six closed jobs are regularly equipped with cowl ventilator, sun visor, windshield cleaner, side coach lamps, clock and gearset and door locks.

Gray Shows Sedan and Coupe

THE Gray exhibit is characterized by the showing of the four-door sedan and coupe. Both of these models are included in the original plans of the company but the first models have just been completed and are shown for the first time. The sedan is priced at \$835 and the coupe at \$685. Coincident with the introduction of these two models is an announcement that the coach has been increased in price from \$760 to \$785.

The coupe has a large luggage space at the rear and the upholstery is in corduroy. All closed cars are equipped with speedometer, instrument lights, lever-operated windows, sun visors and windshield wipers. The glass sash drops to within one inch of the door frames.

The coach has been changed slightly in its fittings. A dome light is now provided and lock handles are now used on the doors. The upholstery is a better grade and an instrument light is used on the dash, the same as in the other closed cars. The four-door sedan has wool upholstery. The door windows are lever operated and the rear windows are stop-operated. All Gray models, both open and closed, are equipped with drum type headlamps.

Haynes Shows New Brougham

A NEW body is shown by Haynes for the first time. This is the model 57 brougham, a four-passenger closed car. There is also a new sedan on the 77 chassis and a few minor mechanical changes on the chassis.

The new brougham is a five-passenger enclosed coach of sport type and is equipped with nickel plated front and rear bumpers, nickel plated headlamps and exterior cowl lights. There is a nickel plated radiator also upon which is mounted a winged cap fitted with a Boyce motometer. Also included in the equipment is a rear view mirror, six disk wheels with cord tires, visor, instrument board, gasoline gage and combination stop and taillight. The driver's seat is upholstered in Spanish leather and the other seats in cloth fabric. A heater is provided in the rear compartment.

The 77 sedan is a new improved design superseding the 75 model and is now put out with the driver's compartment in Spanish leather and the rear compartment upholstered in cloth. A trunk is provided on each runningboard, and disk wheels are offered as optional equipment.

Mechanically the Haynes cars are refined in a few particulars. The bore has been increased on the larger motor from $3\frac{1}{2}$ to $3\frac{3}{8}$ in., the stroke remaining at $5\frac{3}{16}$ in. The intake manifold has been redesigned so that the pre-heating system affects all of the cylinders and not merely those in the center. The new heater is made of aluminum to give greater heat transmission with a ribbed interior surface to assist in vaporization. The Kant-Score pistons have been adopted as standard. This is a spiral slot design of aluminum alloy. The chassis is now lubricated by the Dot high pressure oil gun system. The perfect circle piston ring is used in connection with this piston.

Liberty Car Has Refinements in Bodies and Chassis

A NUMBER of minor refinements have been made throughout the Liberty line. The sedan has been increased in size three inches by the rounding of the rear corners, which were previously more nearly square. The rear fender braces on this model have been increased in size to $\frac{1}{2}$ in. The gasoline tank fastening is now made with a patented lock nut of the cup type, previous fastening has been successively a castle nut and a double lock nut. The pistons have been reduced from 26 oz. to 19 oz. and the piston pin is locked with dowel screws instead of a lock ring as before. Two rings are now used at the top with an oil ring at the bottom. Another change has been made in the camshaft gears, the material now being Condensite Celeron.

New King Has Longer Wheelbase

A NEW model is added to the King line, this being the model 1 with 124 in. wheelbase. Aside from the increase in length and some minor changes, the new car is practically the same as the model K which is continued under the name of LL without change, with the exception that the prices are lower than before.

The Model L is fitted with a 7-passenger sedan among other bodies, this corresponding to the previous 6-passenger sedan, on a previous model, but being larger. The frame is heavier and the mudguards on this model are of the beaded type. The splash apron is longer and heavier and the headlamps are of the drum type. Large cowl lights are provided and cowl ventilation is used. The steering wheel spider is entirely of wood on the closed models and aluminum on the open models. The trunnion brackets are heavier as are also the spring hangers. Camshaft drive is by link belt drive.

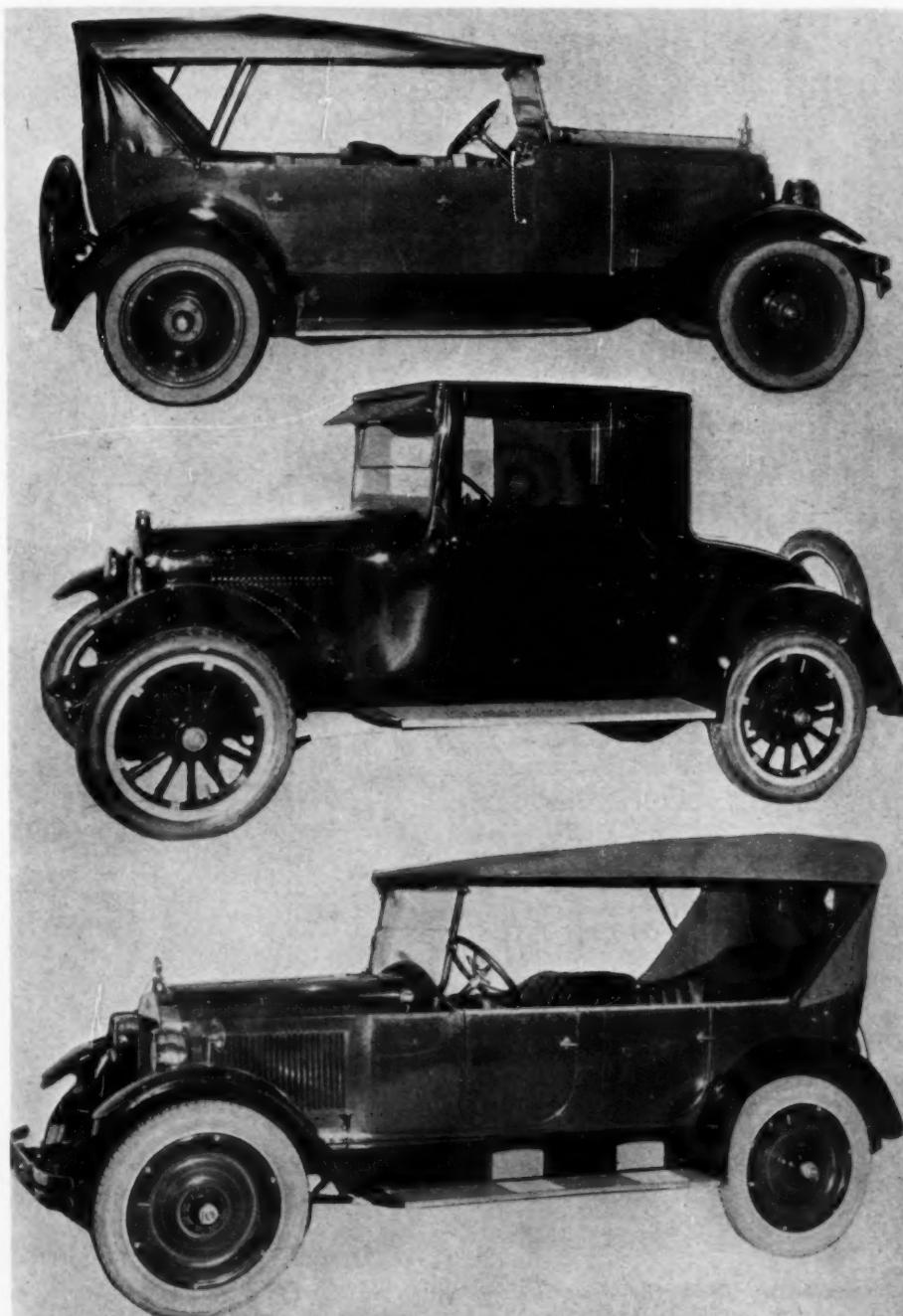
All enclosed models have automatic windshield cleaners, extra tire and tube and cover and snubbers. A front bumper is also provided. The new Model L bodies take the old price of the previous Model K before it was reduced two months ago. These are Phaeton foursome and roadster, \$1,795; sportster, \$1,995; sedanette, \$2,295; coupe, \$2,500, and sedan \$2,625. The prices of the new Model LL are: Phaeton, foursome and roadster, \$1,595; sportster, \$1,895; sedanette, \$1,995; coupe, \$2,200; sedan, \$2,400.

Hupmobile Adds Two-Passenger Coupe

HUPMOBILE has rounded out its line with a two-passenger coupe shown for the first time. It is of standard closed car construction with doors 21 in. wide and 47 in. high. Behind the body is a large storage space containing 17 cu. ft. There is a smaller space behind the seat which provides room for packages and small articles. The car is equipped with window regulators, dome light, windshield wiper and visor. It sells for \$1385.

Gardner Exhibits Radio Special

GARDNER is showing its new sport car, known as the Radio Special, selling for \$1065. It is mounted in the standard chassis and has complete equipment including bumpers, cowl lights, rearview mirror, aluminum step plates, disk wheels, extra tire, kahki top, nickel radiator and nickel lamps. The car is upholstered in brown Spanish leather and is painted a Cobalt blue, with black running gear.



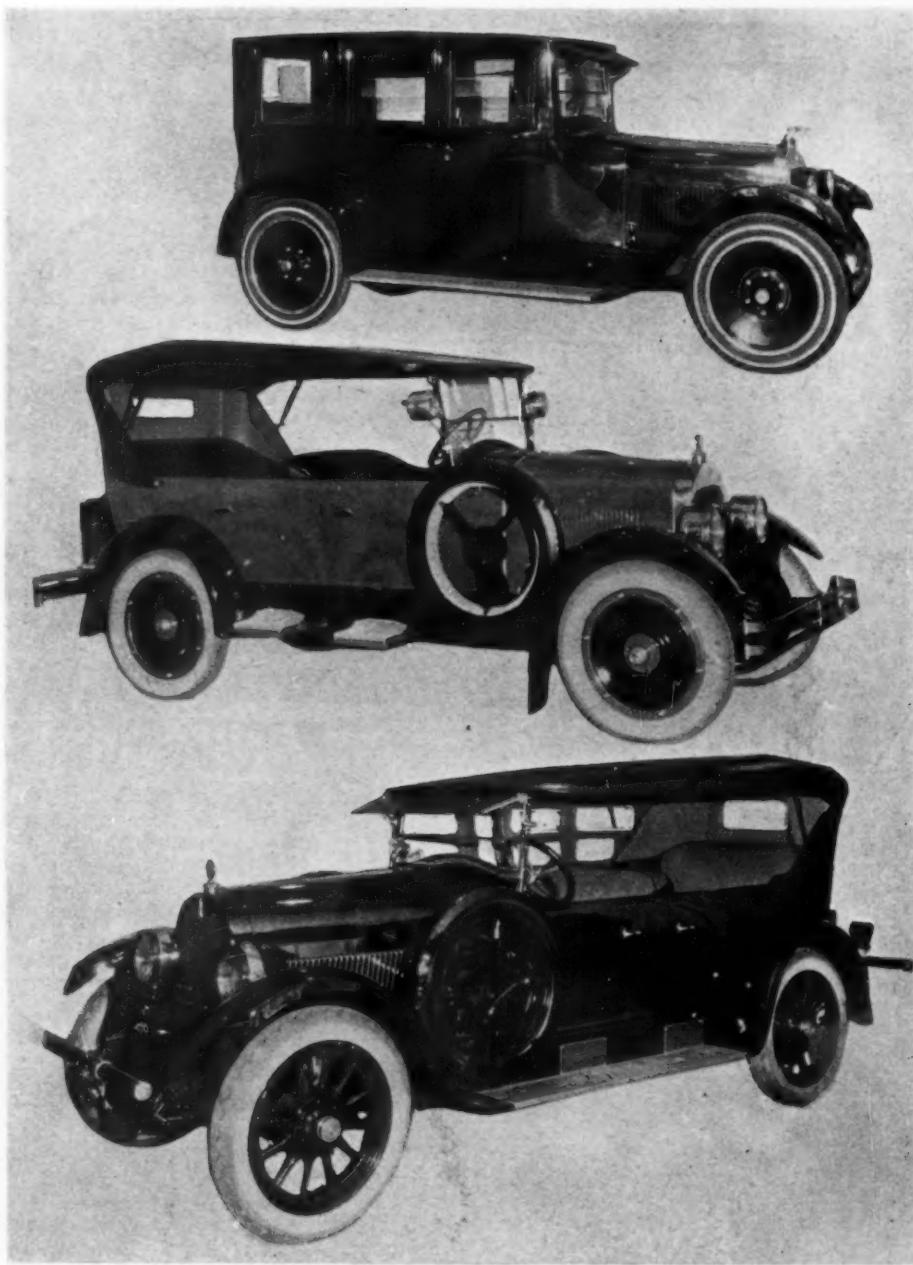
From top down: Phaeton model of the new long wheelbase King. New 2-passenger Hupp coupe. Gardner sport model called the Radio Special

Oakland Exhibits Its New Sport Roadster

A NEW sport roadster is being shown by Oakland. It is painted light maroon and is upholstered in brown Spanish leather. Regular equipment includes nickel-plated drum headlights with cowl and tall lamps to match, nickel-plated radiator shell with cross-bar cap and motometer, nickel-plated body guards on rear deck, windshield wings, mirror and step mats. Disk wheels with demountable rims are used. The instrument board is walnut covered with glass and the instruments are silver faced. This model is in addition to the regular roadster and lists at \$1145.

Dorris Makes Changes in Coupe and Brake System

THE Dorris coupe has been made longer and the increase in size has been all added to give more leg room. The other models are unchanged. The brake layout on the 680 chassis has been changed in some detail. The brake rocker arms extend through the frame, being supported in the spring hangers, the rocker arms being outside the frame and leading to the brake operating mechanism in nearly a straight line. An oil well and wick on the spring shackle provide lubrication. Lovejoy shock absorbers are now standard equipment on all models but the seven-passenger.



From top down: Wills-Sainte Claire's Grey Goose Special sedan. Velie sport phaeton in robin egg blue. The Jay-Eye-See Sport phaeton of the Case Company

Case Has New Sport Phaeton

A NEW sport phaeton, known as the Jay-Eye-See, has been added to the Case line. It is mounted on the standard Model X chassis and sells for \$2230. Plate glass is used in the curtains instead of celluloid and the lower glass in the left front curtain slides open to allow the driver to extend his hand for signal.

A spotlight is mounted in the lower glass of the windshield and the sun visor is of the rolled curtain type. A Perfection heater is installed in the tonneau. The cushion seats and backs are provided with slip covers and the trunk compartment has a carpet instead of the conventional rubber mat. The equipment includes stop and tail light, trunk, front and rear bumper and hand windshield

wiper. The door checks on all models slide in a guide instead of bending.

Hartford shock absorbers are now standard equipment on the Model X chassis and Gabriel snubbers are used on the Model W. The Model X chassis has been strengthened at the front end by a plate at the cross frame member.

Lang Body

A FOUR-PASSENGER de luxe coupe mounted on a Dodge Bros. No. 3 chassis is being shown at the Hotel Pennsylvania by the Lang Body Co. of Cleveland. This job is strictly a dealer proposition as are the taxi body and 96 in. panel delivery body mounted on Dodge Bros. chassis which are being exhibited at the same hotel by the Grand Rapids School Equipment Co. of Grand Rapids, Mich.

Two New Wills-Sainte Claire Bodies

TWO new bodies have been added to the Wills-Sainte Claire line. Both of these being mounted on a longer chassis of 127 in. wheel base as compared with the standard 121 in. These bodies are the Grey Goose Special, a four-passenger close coupled car which is exhibited at the show and sells for \$2875 and the other which is not shown is a seven-passenger body selling for \$2790.

In lengthening the chassis it has been necessary to increase the strength of the channel side rails which has been done by deepening them. The webb is now 7 in. instead of a 6 in. and a cross member has been added at the rear center to increase the stiffness. The suspension on the longer chassis has also been altered by increasing the length of the rear springs making them 58 x 2 1/4 in. in place of 54 x 2 in. As they are on the standard chassis.

Velie Has New Sport Phaeton

VELIE is exhibiting a new sport phaeton priced at \$1565. The show model is painted a robin's egg blue but deep red paint is offered as an option. An interesting feature is a tonneau lamp mounted in the back of the front seat. This lamp has 20 ft. of cord so that this lamp may be used as a trouble light. Disk wheels with nickel demountable rims and two extra tires are regular equipment. Other equipment on this body includes individual steps, two spotlights on windshield, front and rear bumpers, trunk with two suitcases and polished body guards, clock, cigar-lighter windshield wiper, and mirror.

All Velie open models are now furnished with polished walnut dash and body rails. There is also bright aluminum bead at the rear of the hood. The sedan and brougham are now equipped with vanity case, smoking set, mirror and windshield wiper.

New Two-Passenger Oldsmobile Coupe

A NEW two-passenger Oldsmobile coupe on the four-cylinder chassis is exhibited for the first time at the show. The price on this model is \$1195. The finish is blue with gold striping, and the upholstery is green Spanish leather with inside top lining of taupe velour. Doors are 25 in. wide, seats 43 in wide and the coupe height is 46 in. Plate glass is used throughout and there is a roll curtain for the rear window. Regular equipment includes gearset lock, cowl ventilator, windshield wiper and dome light. There is a luggage compartment in the rear deck and another one in the back of the seat.

Reo Shows a Close Coupled Sedan

REO is showing its new four-passenger brougham. This is a close coupled sedan and will retail at \$2185.

The frame work is of ash and maple and the panels of 20-gage steel. The soft top is used to reduce noise. The door openings are 25½ ins. wide and the doors are fitted with crank type window regulators. Three of the doors lock from the inside while the fourth is locked with a key from the outside. The front seat is 22 ins. wide and 46½ ins. long, while the corresponding dimensions for the rear seat are 24¾ ins. and 47½ ins.

The instrument board is solid walnut and carries speedometer, ammeter, electric clock, cigar lighter, instrument light, trouble light socket and cowl ventilator control handle. Regular equipment includes heater in the rear compartment, trunk with cover, aluminum guard bars, sunshade and automatic windshield cleaner. Interior fittings are finished in silver and there are both corner and dome lights provided, as well as rearview mirror and robe guard.

The body is supplied in two standard finishes—deep maroon with black above the belt, or deep gray with black above the belt. The wheels are Tuarc with 32 in. and 4 in. Firestone rims. The tires are 33 in. by 4½ in. Other equipment includes bumpers, front and rear, motor meter and aluminum kick plates. A new type of Rayfield carburetor is fitted as standard on this model. It is provided with thermostatic control and the new type of air heater.

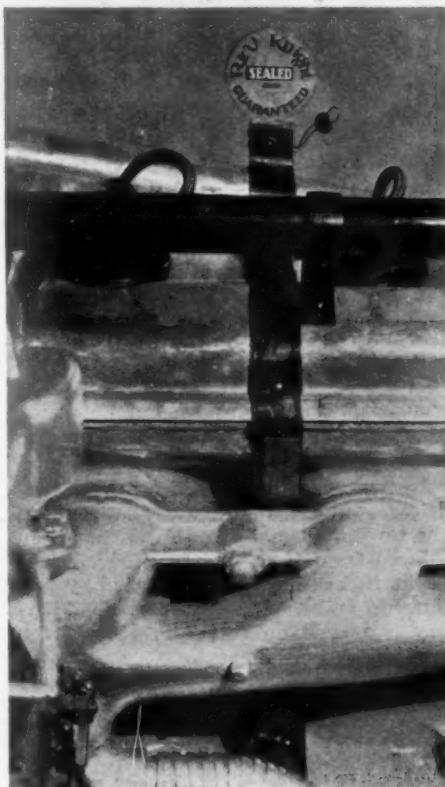
Anderson Four-Door Sedan

ANDERSON shows a new four-door, five-passenger sedan listing at \$1595 on the Aluminum six chassis. The upholstery is of brown and black striped mohair plush. The hardware is satin finished silver of attractive design. The windshield is of the perpendicular, straight front type with upper part of it adjustable. A cowl ventilator with dash control provides ventilation for the driving compartment. The door and window sashes are of the felt lined, slide channel type and are all equipped with regulators. Three of the doors have inside locks and the fourth an outside locking handle. Disappearing chain door checks are used.

Equipment includes motometer, foot rest, robe, straps, vanity set, clock, dome light, reading lamps, windshield cleaners, sun visor, guard rails, kick plates, heater and foot dimming switch. The foot dimming switch is a button located immediately behind the clutch pedal where it may be conveniently operated by the foot. The body and hood of this model are finished in maroon with carmine striping. The chassis, fenders and running boards are black.

R & V Features Two-Year Guarantee

A FEATURE of the new R. & V. described in the Jan. 4th issue of MOTOR AGE, is the two-year guarantee on the engine contingent upon the engine seal remaining unbroken during that period. This seal consists of a strap which entirely surrounds the engine and fastened



This seal is placed on the new R & V Knight engine

with a pressed lead seal so that it is impossible to remove either the cylinder head or the engine pan without breaking the seal. Authorized service stations are permitted to reseal engines during the period.

Elcar Shows Refinements in Four and Six

BOTH the four and six-cylinder models of the Elcar have been subjected to minor changes and the units, in some cases, have been changed. The 4-cyl. model is now using the new Lycoming engine with a 5-bearing crankshaft and the 6-cyl. model now uses a Continental 8-E with 3½ in. bore instead of the 3¼ in. Continental model previously used. Prices on the 6-cyl. models are: Phaeton \$1395, sedan \$1395, sport \$1595 and brougham \$1995. The phaeton price is the same as before but the other models represent slight reduction. The brougham is a new closed model on the 6-cyl. chassis. The radiator is wider and higher on the six and the cowl is correspondingly straighter and higher. The fenders are pressed steel. The tires are now 32 x 4 instead of 33 x 4.

Handley Introduces the Semi-Custom Built

HANLEY shows an entirely new chassis which is of the overhead valve type. The Knight engine is discontinued by this company. The two features of the chassis from an external viewpoint are the use of fabric spring shackles and an extremely deep V-type radiator with a fan built close into the included angle of the V, the blades being sloped backward. The model 660 phaeton is priced at \$2,000, the 640 sedan being \$1300.

The engine is a unit power plant with six cylinders, 3½ x 4½ cast in block. The cylinder head is detachable and the valves are enclosed and operate in oil. Cooling is by thermo-syphon system. The service brake is on the rear wheels and the emergency, in back of the gearset, on the propeller shaft. Drive is of the Hotchkiss type. The springs are semi-elliptic all around. The fuel is carried in a 15-gal. tank at the rear, fed by vacuum system to the carburetor. The clutch is of the dry plate type. The electrical equipment is of the 2-unit type with ground return and the ignition has an automatic cutout.

The steering gear is of the sliding block type and the column is surmounted by an 18-in. wheel. The tires are 32 x 4½ cord and the wheelbase 115 in.

Buick Adds a Sport Roadster on the 4-Cylinder Chassis

A SPORT roadster mounted on the four cylinder chassis is the new feature at the Buick exhibit. This body is finished in red with nickel trimming. The nickel parts include radiator shutter, windshield wiper, gearset lever, emergency brake, running board guard, deck rail, hood fasteners, running board banding and binding for the khaki top.

Equipment furnished with this model includes drum head and cowl lamps, motometer with crossbar radiator cap, windshield wings, mirror, cowl ventilator adjustable from the instrument board and the usual instruments.

The steering wheel is walnut and so is the ball on the end of the gearset lever and the horn button. Upholstery is leather. There is a large compartment for packages back of the driver's seat and a luggage compartment in the rear deck. Toe and floor carpets are removable. Wood wheels are regular equipment but wire or disk are furnished at additional cost. The new car is designated as model 4-39 and lists at \$1025.

Copper Cooled at Commodore

A CHEVROLET copper-cooled chassis is exhibited at the Hotel Commodore as well as at the Grand Central Palace.

Auburn Shows Two New Chassis

Two new Auburn chassis are shown, the 643, which is a smaller model than the previous line, and the 663 which is a larger model. The present model 651 is continued as before but the prices have been reduced. The new prices on this model are:

	New	Old
5-pass. phaeton	\$1275	\$1475
7-pass. phaeton	1345	1545
Sport	1895	—
Brougham	1965	—
4 and 7 pass. sedan	2245	2345

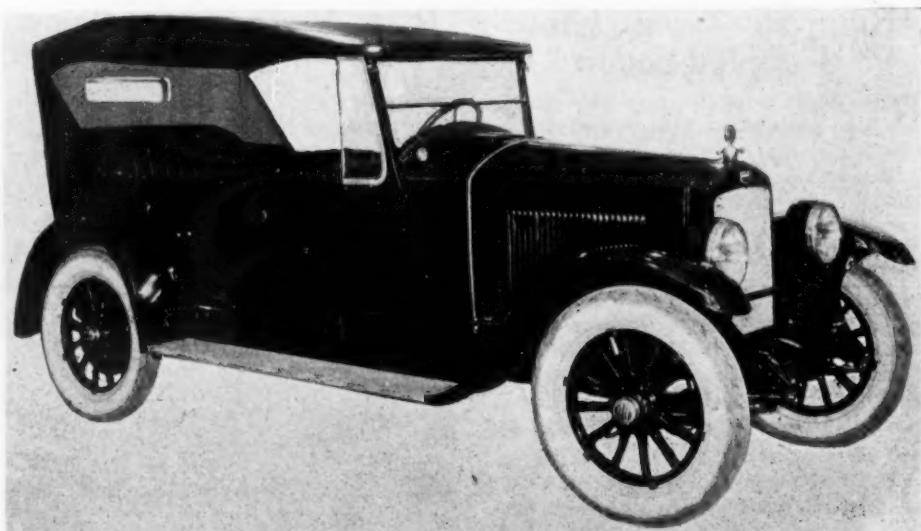
The model 643 sells for \$1095 in the five-passenger phaeton and is to be had with a permanent top at an extra cost of \$50. The five-passenger touring sedan is priced at \$1465, this price including a heater and trunk. The standard color for this model is Brewster green. The wheelbase is 114 in., the engine a 6-Y Continental, $3\frac{1}{8} \times 4\frac{1}{4}$, Borg & Beck clutch and Warner gearset. The carburetor is a Stromberg and the emergency brake is on the driveshaft at the rear of the gearset. Both front and rear axles are Columbia and the frame is 6 in. deep.

The Model 663 has a wheelbase of 122 in. The engine is an overhead valve, $3\frac{1}{4} \times 5$ in., with a full pressure lubrication system. The carburetor is a Stromberg, starting, lighting and ignition is Remy, clutch is Borg & Beck and gearset is a Warner. Columbia axles are also used on this model and the emergency brake is of the transmission type. The tires are 32x4 in. and the equipment includes motometer with a locking bar cap and windshield wings that open and close with the curtain. For the present only the five-passenger phaeton is to be had in this model, this being priced \$1650 equipped with a permanent top. Other models will be in production later.

Advanced Engineering Features in New Chandler Six

CHANDLER presents a completely redesigned engine which is designated as the Pike's Peak Motor. The bore and stroke, $3\frac{1}{2} \times 5$ in., remains unchanged, but there have been numerous improvements that result in better performance. The compression has been increased from 71 to 84 lbs. and the shape of the combustion chamber has been changed to secure greater turbulence in the cylinders. The valves are $3\frac{1}{2}$ deg. from the vertical. The increased turbulence prevents knocking and carbon formation. The cylinders are now cast in block.

The crankshaft is 20 lbs. heavier than in former models and now has four bearings, each $2\frac{1}{2}$ in. in diameter. The main bearings are bronze backed. The cam-shaft and crank pin bearings have also been increased in size. The crankcase construction has been strengthened. The front end drive is by a single Morse chain, the tension of which may be adjusted from the outside. There has been an increase in radiation surface and the cooling fan now has six blades. It is



One of the new 6-cylinder Auburn models in the phaeton type

driven by a V belt. The gear type oil pump bolts to the left side of the crankcase where it is readily accessible. The crankcase drain plug has an extension which permits draining the crankcase without getting under the car.

Anti-rattles are installed on the spring shackles and on the brake equalizer bar. The turning diameter of the car has been reduced from 44 to $39\frac{1}{2}$ ft. The clevises on the tie rod have been replaced by ball joints to make steering easier. The battery is placed on the right side in the new model and the exhaust goes down the left. All electrical equipment is on the right side of the engine. Taper roller bearings have been put in the steering spindles.

The radiator is $\frac{3}{4}$ in. higher and the shape of the shell is somewhat different although the distinctive Chandler outline has been retained. A new body model, the Chummy Sedan, is shown for the first time. This is a two-door, five-passenger job with tilting front seats. The factory list on it is \$1695.

Prices on the entire line have been reduced. The reductions approximate \$100. The new price list is as follows:

5-passenger phaeton	\$1395
7-passenger phaeton	1545
Royal Dispatch	1695
4-passenger roadster	1595
Chummy Sedan	1695
Metropolitan Sedan	2195
7-passenger	2295
Limousine	2995
Chassis	1195

Durant Sport Models Exhibited

DURANT is showing the two recent sport editions to its line. This consists of a four passenger phaeton at \$1090 and a sport sedan at \$1465. These prices are \$100 more than the standard models and cover the extra equipment which consists of Boyce motometer, bumpers, trunk and trunk rack and rear view mirror. Durant is offering disk and wire wheels as optional equipment at no extra charge on any model.

New Packard 5-Passenger Coupe

PACKARD has added and is showing a new five-passenger coupe, selling for \$3350. This is a two-door body with fixed driver's seat and folding pullman seat in front with closed coupled three-passenger rear seat. The body contour is similar to the sedan model with the exception that it is shorter and has two side lights instead of three. It is a touring type being fitted with a trunk and rack as standard equipment. With the exception of the trunk the fittings and equipment are the same as on the other Packard closed models. Packard is also showing a custom built cabriolet body on the twin-six chassis. This is a Fleetwood product and not a standard model.

Stanley Features Sedan

A NEW five-passenger sedan features the Stanley exhibit this year which also includes a chassis and a phaeton. This sedan is brought out to bridge the gap between the standard phaeton and seven-passenger sedan. With the exception of this new body model, the 740 series is carried over with only minor changes since it was first brought out last summer. The five-passenger sedan is priced at \$3585.

The phaeton now carries a permanent top with a solid member which permits of using glass side curtains for winter driving. A metal plate covers the rear gas tank which supports a Y bracket tire carrier.

Noma Line Has Slight Changes

THE Noma line is continued without change excepting that the spare wheels are carried one on each side instead of both being carried on the rear as before.

National 6-31 an Important Show Development

THE new National Model 631 which lists at \$795 is one of the most important developments of the show. This is the lowest priced six-cylinder car made and, furthermore, no six-cylinder job has ever been priced at as low a figure before. The complete National line for 1923 includes in addition to the small six, the Model 651 at \$1485 and Model 671 at \$2485.

These three models are all produced by the National Motors Corp. which was formerly the Associated Motor Industries. This company is an amalgamation of the National Motor Car and Vehicle Corp., the Kentucky Wagon Corp., makers of the Dixie Flyer, the Traffic Truck Corp., and the Jackson Motors Corp.

The Dixie Flyer and the Jackson cars will not be manufactured in the future. The small six will be assembled in Louisville, the medium six will be manufactured at Jackson and the large six will be produced at Indianapolis.

The small six, Model 631, is furnished with either phaeton or sedan body. The phaeton lists at \$795 and the sedan at \$1095. The wheelbase is 112 in. and the tires are 31 in. x 4 in. Wood wheels are regular equipment.

The six-cylinder engine is cast in block and has detachable cylinder head. Cylinder dimensions are 2 1/8 in. x 4 1/2 in. Lubrication is by pressure to the main bearings. The radiator is cellular type and water circulation is by thermosyphon. Stewart-Warner vacuum fuel

system is used and the carburetor is 1 in. size. Starting, lighting and ignition equipment is of National make. The battery is a Prest-O-Lite.

The multiple disk clutch, gearset, universals, axles and steering gear are made specially for this job in the plant of the Covert Gear Co., which is owned by the National Motors Corp. The springs are semi-elliptic all around and the frame is of hydraulic pressed steel. The rear axle gear reduction is 4.6 to 1. The estimated weight of the phaeton model is 2100 lbs.

Model 651 has the Continental 8-R engine used in the Jackson. The prices on this model are as follows:

5-passenger phaeton	\$1,485
2-passenger business coupe	1,785
5-passenger sedan	1,885

The cylinder dimensions of the engine in this model are 3 1/8 in. by 4 1/2 in. Cooling water is circulated by centrifugal pump and lubrication is by pressure to main and connecting rod big end bearings. The carburetor is a Stromberg and the fuel is fed by Stewart-Warner vacuum system. Auto-Lite starting and lighting is regular equipment. The clutch is a Borg & Beck and the gearset is a Covert three-speed type, mounted as a unit with the power plant. The rear axle is a three-quarter floating type with spiral bevel gears. The front springs are 39 in. long and rear springs 58 in. long. Both propulsion and rear axle torque are taken through the springs.

The frame is pressed steel, the side rails being 5 1/2 in. deep with 2 1/2 in. flanges. There are four cross members. The emergency brake operates on the transmission and the service brake acts externally on drums on the rear wheels. The wheelbase is 121 in. and the tires are 32 in. x 4 in. Wood wheels are regular equipment.

The model 671 is shown in three body styles. Prices on this line are as follows:

5-passenger sport phaeton	\$2,485
5-passenger sedan landau	3,285
7-passenger sedan	3,285

This model is similar from a mechanical standpoint to the model BB which it supercedes. The frame has been redesigned to secure greater stiffness and a new type of Rayfield carburetor with water jacketed bowl and electrically heated primer is used. The model 671 looks entirely different from the model BB however because of the new line of bodies. The bodies used on all three chassis models were designed by H. F. Holbrook.

The feature of the open models is the unusually wide doors. This has been made possible by the elimination of the narrow panel which separates the front and rear doors on most phaetons. This feature also simplifies the design of the side curtains. The hood and radiator design is of the high narrow type and the bodies have a stream-line appearance. The side panels are smooth. The open models are fitted with permanent top.

Air-Cooled Fox at Commodore

THE Fox display at the Hotel Commodore consists of a chassis, standard five-passenger phaeton with Fleetwood body, three-passenger coupe and five-passenger sedan. Bodies remain unchanged for 1923 with the exception of the sedan which is 6 in. longer and has 2 in. more headroom.

A shaft driven overhead camshaft is now used in place of the camshaft in the engine base, otherwise the engine remains unchanged. Drive is now taken through a torque arm and the propeller shaft brake is replaced by a brake on the rear axle. Brown-Lipe multiple disk clutch and Timken bearings in both front and rear axle are now used.

Price of the phaeton is reduced from \$3900 to \$2975 and both closed jobs are cut to \$3975 from \$4900.

Courier Lengthens Body

COURIER is showing a new four-passenger body which is 5 1/4 in. longer than the previous design. By altering the position of the doors, additional entrance room has also been

gained. The other changes on this body include a trim rail around the side, carpet in the front compartment, a new one-piece windshield with nickel brackets, and new arrangement of the dash instruments. A new flat cross member across the frame over the tank, spare wheel carrier at the front, front and rear bumpers and trunk bars on the back. The car is painted a coach red.

Westcott Shows a New Sedan

A NEW Westcott Sedan is shown mounted on the B-44 chassis. It is of the 5-pass., 4-door type and sells for \$2490. An option of beige, purple, lake and a maroon is to be had, the running gear and fenders being black in any case. A trunk is mounted on the rear.

Stephens Shows New Line

THE Stephens is exhibiting a new line which was brought out a few weeks ago and the 7-pass. sedan at \$2385, touring sedan at \$1595 and sport phaeton at \$2,085 are shown for the first time.

Barley Makes Slight Changes

THE Barley six is shown with slight changes in the exterior, principal of which is the rounded radiator which replaces the sharp angled radiator previously used. German silver is used on all models. The Roamer models, with Continental and Duesenberg engines, are continued without change.

Davis Shows a Fleetaway

THE Davis exhibition includes a new Fleetway sport phaeton, priced at \$1695. The equipment on this model is very complete. The chassis is standard. The Model 70 is now a regular stock model and is the same as model 71 but the equipment is not so extensive. The price of this model is \$1195.

First Showing of the Flint

THE first public showing of the Flint car, Durant's new product, is being given at the Hotel Commodore. The full line comprises a five-passenger phaeton, four-passenger coupe and five-passenger sedan, all of which are being exhibited.

Price Changes Comparatively Few

Less Than a Dozen Companies Announce New Lists at Show

NEW YORK, Jan. 8—That the industry is back to normalcy is evidenced by the price situation. Whereas a year ago nothing but price was talked about in the show and around the hotels, this week little is heard of new lists. Not more than a half dozen companies had announcements of price changes to make when the show opened Saturday, and it is not expected that there will be many more during the week. Several of these changes were caused by new models or changes in design of existing models.

Cole made the most radical cut, lowering the list on its open model \$700, dropping from \$2685 to \$1885. On the sedan the reduction was from \$3685 to \$2685. Chandler, announcing a new line, cut \$100 from the open job and \$400 from the enclosed. Overland took off \$15 from the sedan, the only cut made in the Overland line, while the Willys-Knight there was a reduction of \$150 on the five-passenger sedan and \$200 on the seven-passenger sedan, while the coupe went from \$1795 to \$1695. Steph-

ens also made a substantial reduction. Following are the new prices:

COLE		
	Old price	New price
7 passenger	\$2,685	\$1,885
4 passenger Sport	2,685	1,885
2 passenger Roadster	2,685	1,885
Coupe	2,885	2,585
Sedan	3,685	2,685

CHANDLER		
	Old price	New price
5 passenger	\$1,495	\$1,395
5 passenger	2,295	1,695

PAIGE		
	Old price	New price
7 passenger Phaeton	\$2,195	\$2,450
4 passenger Phaeton	2,245	2,450
3 passenger Roadster	2,495	2,695
5 passenger Brougham	3,155	3,135
5 passenger Touredan	3,100	3,235
7 passenger Touredan		3,235

OVERLAND		
	Old price	New price
Sedan	\$ 875	\$ 860

WILLYS-KNIGHT		
	Old price	New price
Coupe	\$1,795	\$1,695
Coupe Sedan		1,595
5 passenger Sedan	1,950	1,795
7 passenger Sedan	2,195	1,995

STEPHEN'S		
	Old price	New price
2 passenger Roadster	\$1,575	\$1,345
5 passenger Phaeton	1,595	1,295

AUBURN 6-51		
	Old price	New price
2 passenger Roadster	\$1,575	\$
5 passenger Phaeton	1,475	1,275
7 passenger Phaeton	1,545	1,345
4 pass. Sport Phaeton	1,995	2,245
Sedan	2,345	2,245
Brougham		1,965

KING		
	Old price	New price
2 passenger Roadster	\$1,495	\$1,595
5 passenger Phaeton	1,495	1,595
4 passenger Sport	1,495	1,595
Coupe	2,200	2,200
Sedanette	1,995	1,995
Sedan	2,400	2,400

124 W. B.		
	Old price	New price
Coupe	\$1,995	\$2,550
Sedan	2,550	2,625

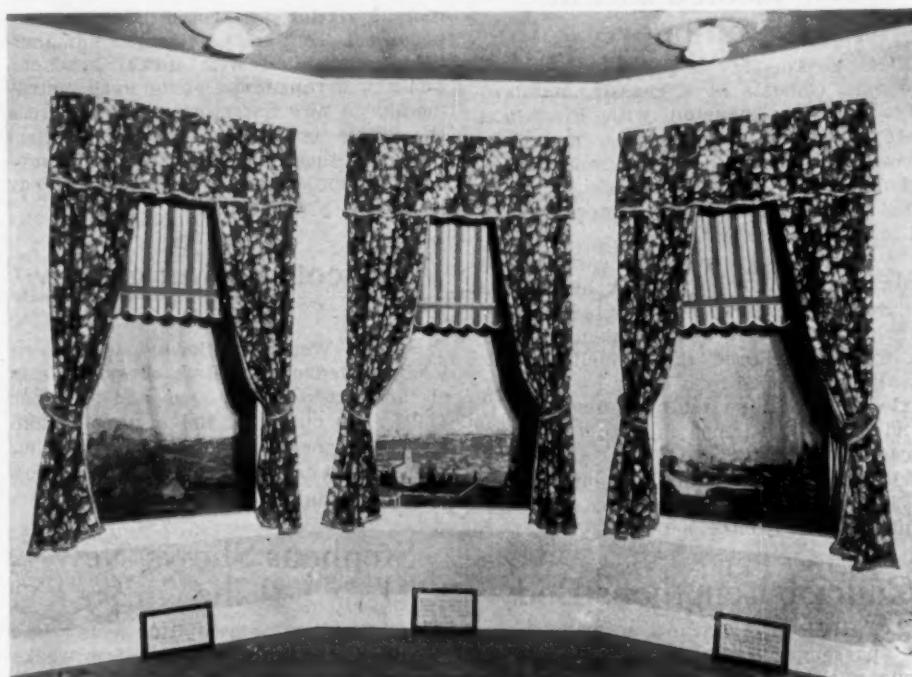
WESTCOTT		
	Old price	New price
Sedan	\$2,890	\$2,490
Special Sedan		2,690
Brougham	2,490	2,490
Closure (Coupe Sedan)		1,795
Special Closure		
(Coupe Sedan)		1,995

and in the following year 4,065 cars were made and the company showed a profit of more than a million dollars.

In 1909 Willys bought the Pope-Toledo plant in Toledo, probably the most modern of its time.

NEW DAVIS MODEL COMING

RICHMOND, Ind., Jan. 8—The Davis Motor Car Co. will bring out a new model 76, 5-passenger brougham about Feb. 1. This will be mounted on the model 70 chassis and priced at \$1595.



The Bureau of Roads had an interesting and attractive exhibit. The visitor looked through three windows on varying road scenes

Dealers to Get More Help from the Factories

MOTOR car manufacturers are thinking more seriously than ever before about selling their products.

Among the factory representatives present at the show on the opening day there was an unmistakable disposition to establish closer relations with distributors and dealers and to actively participate in their selling plans for 1923.

Some came to New York with complete merchandising plans which not only provided for more comprehensive assistance in the form of advertising and direct mail service, but which actually laid before the dealers a concrete plan for finding prospects for their particular type of car, a detailed method of follow up and valuable display and demonstration information.

Throughout the entire price range of cars there was the fairly well defined opinion that the big need of the industry today is better merchandising of the kind that begins with the maker and follows through to the consumer. Many sales managers frankly admitted that the retail distribution of their products has been made one of their big considerations in 1923 and that a great part of the energy of the factory selling organizations would be devoted to selecting good dealers and then giving them evidence of merchandising assistance that can be generated.

One sales manager who is typical of the leaders in this idea, said: "The system of distribution that loads dealers with cars and does not provide them

with the tools of selling must be revised. It is responsible for much of the grief in the industry and for the high dealer mortality of the past two years. Factories must realize now, and many of them are, that the problem of disposing of the products from the assembly chains is not solved by placing it on the shoulders of the distributor and dealer." It is interesting to note that this sales manager was one who came to New York with a complete, definite, practical selling plan and that he is selling his cars to distributors and dealers wrapped up in the plan.

A noticeable trend in the attitude of factory sales managers was toward more careful selection of dealers. There is a strong inclination to seek out men of established business ability and not a few of them are beginning to go outside the industry, selecting men for proven ability to sell and manage businesses in preference to those who may be strong only in familiarity with motor cars.

As a general thing the industry is not giving serious thought to the question of distributorships versus factory branches and it is certain there will be no widespread substitutions of the latter except for failure of the former to function satisfactorily. Sales as a general rule are coming through in such volume as to leave little to be desired and for that reason, also, there will be little inclination to "swap horses in the middle of the stream."

Abandonment of the system under which factory representatives were

young fellows without particular experience as to retail problems and the substitution of former high-powered distributors at adequate salaries, who circulate through the sales organization giving merchandising assistance, is the program of at least one factory.

One company has a plan which appoints star retail salesmen at its branches as captains having groups of salesmen under them. These captains sign contracts to take over the sale of a certain number of cars. Terms are made according to the number of cars sold. The plan has worked satisfactorily thus far.

Another company working out special analysis of sales possibilities for its cars in all sections of the country, is making contracts with dealers on the basis of this analysis. This company will do business with dealers on the basis of what their territories ought to take and will put enough dealers in each territory to bear out their estimates. They are working toward more small dealers rather than a few large ones.

All of these plans and many others not mentioned here support the unmistakable trend toward closer attention of manufacturers to the problems of merchandising and toward greater cooperation with distributors and dealers.

It is another indication that the motor car industry is passing into the great merchandising era, on the threshold of which the 1922 shows found it, and which the 1923 show season will usher fairly within the door.

NOTES OF THE SHOW

NEW YORK, Jan. 8—Walter P. Hanson came to the show with a new title—advertising manager of the Haynes Automobile Co. He had been assistant director of advertising and sales.

Cleveland expects that 70 per cent of its 1923 output will be enclosed jobs, a considerable jump from 1922, in which year the percentage was 55. As indicative of the trend, the Cleveland company reports that 91 per cent of its December production was enclosed.

Reo went into the show without any cars in stock, while no distributor had more than a month's supply of cars on hand. December business was 100 per cent over December, 1921, and the Reo representative in Chicago did three and one-half times the business this December than in the preceding December.

A factory expansion is taking place at Reo, which is building a new shipping room and storage warehouse, adding 300,000 square feet to the storage warehouse.

News came to the show of the death in El Cajon, Cal., of J. Elmer Pratt, one of the pioneers of the industry who passed away after an illness which had lasted several years. Pratt came from the bicycle era, in which he was identified with G. & J. and Clipper. He was associated with W. E. Metzger in the early Cadillac days and from there went to Flint with W. C. Durant and Buick. After that he was sales manager of Pierce-Arrow for seven years. Starting for himself, he organized the Hygrade Motors Co., of Grand Rapids, Mich., manufacturing trucks.

HANLEY HAS NEW CONTRACT

NEW YORK, Jan. 8—Handley Motors, Inc., has drawn up a new dealer contract which establishes closer association of the distributor and factory. The chief feature of this contract is its profit sharing clause, which permits the dealer to participate in the profits of the company. The contract is non-cancelable without cause.

NEW OVERLAND DEALER PLAN

NEW YORK, Jan. 8—A new dealers' policy has been announced by the Willys-Overland Co., which has more retailers here than ever before.

This new wholesale financing plan, which went into operation the first of the year, is designed to enable the dealer to stock up during the winter months and be ready for spring business. Under this scheme the dealer pays 15 per cent of the net price when he orders, the balance being time payements running from two to six months, with interest charges of 6 per cent plus 2 per cent per annum. If the dealer discounts he gets 6 per cent rebate, but pays the 2 per cent because that really represents bookkeeping charges.

The Overland financing scheme will be carried by the Commercial Credit Co., which recently succeeded the Continental Guaranty Co.

MOTOR AGE

Reg. U. S. Pat. Off.
PUBLISHED EVERY THURSDAY
Copyright 1922 by The Class Journal Co.

Vol. XLIII

Thursday, January 11, 1923

No. 2

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SUBSCRIPTION RATES
United States, Mexico and U. S. Possessions..... \$3.00 per year
Canada..... 5.00 per year
All Other Countries in Postal Union..... 6.00 per year
Single Copies..... 35 cents
Subscriptions accepted only from the Automotive Trade

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.
Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.
Member of Associated Business Papers, Inc.
Member of the Audit Bureau of Circulations.

Seasonal Tire Prices

IN past years there has been a good deal of unpleasant comment about the time of the year when the tire factories announced changes of prices. Perhaps much of this comment has been justified and there is plenty of evidence that certain factories have cut prices at seasons that suited their own selfish interests, rather than that of their public reputation or the good of the tire business as a whole. Indeed, it is sometimes hard to think of any factory that has looked to the good of the tire business as a whole.

That is not as it should be and this year it is interesting to see that tire factories are announcing tire price changes at an early season and before the spring activities begin. There does not appear to be much confidence on the part of the tire dealers that the factories will go into the big selling season without doing something foolish in the way of price changes and one tire dealer says that no factory representative has attempted to justify to him the recent price advances or to assure him that prices will not be cut as soon as he stocks up for spring.

We believe that other factories are doing better than the factory this man represents, as they must if they are to hold the confidence of their dealers. The factories have taken long and important steps in wiping out expensive branches and otherwise improving their distribu-

tion systems, and we believe that they mean to do well by their dealers. It is the fault of circumstances, rather than intention, that so many tire manufacturers do not take dealers more into their confidence and make a compact, going concern out of their merchandising machine.

Some day tire manufacturers are going to realize that dealers are human and have a fair degree of intelligence. There is room for improvement, of course, and there will be improvement if proper encouragement is given. Just at present, the price advances that should be an encouragement to all tire dealers are being regarded with suspicion by some. The reason is not hard to find.



For 25 years you've been working on indefinite orders and the job the car owner thought would cost \$3 comes to \$37. And he howls.—SHERMAN.



The New York Show

THE manufacturers' interest in the selling problem is the most marked evidence at the New York show and this is as it should be. The second most suggestive tendency is the progress toward accessibility on the part of the engine designers and this is also rather marked for the rest of the chassis. Again this is as it should be.

This show is evidence that the engineering as far as mere design and performance is concerned is pretty well standardized and that development will be largely in detail. In this sort of progress the sale might as well be kept uppermost, for we must regard maintenance as a part of the sale. It is just as necessary to keep the car sold as it is to sell it and maintenance is the big argument in keeping the car sold and in making the resale.

The manufacturer interest in the sales problems is needed. It means more help for the dealer and a greater consideration for his future, which means in turn a greater prosperity for him and a better assurance for his future.

There was much evidence at this show that the changes on body styles and possibilities are not nearly to the end of this development. There is much to be done in the way of body design, and development and the comfort of the passenger is being recognized more and more. In all, this field appears to be the one in which notable advances will be made in the next few years. This will mean much, for today the body is apparently the weakest point of the automobile.

The New York show has some very good indications of a better future for the dealer.



If you pay a man 60 cents an hour for ten hours, and an hour is wasted, the labor cost to you is 66 2/3 cents an hour.—SHERMAN.



Better Training Needed for Mechanics

IT is sometimes helpful to get the other fellow's point of view, even when it does not coincide with our own, and this is particularly true if we are broad enough to profit by his criticisms. The automotive industry depends for its bread and butter, and its cake as well, on the good will of the car user, yet we seldom listen to his story. One car user, however,

apparently feeling that MOTOR AGE could put his story across where it might do some good, wrote us the following letter:

"Many automobile repair shops and battery service stations are trying to work without tools for the job. When you need to have your battery charged, it is a ten-to-one chance that it will be handled by some of the 'don't-care-a-damn' class of hired help, and that more damage will be done than the cost of recharging and changing the battery. Instead of having battery tongs to force the terminals loose from the battery posts, they will probably use a hammer and also knock the posts loose from the battery.

"This abuse is similar to the abuse of tire rims at service stations where they use a heavy steel hammer on the rim, instead of a rawhide mallet, or copper hammer. I have often seen good new tire rims gashed and nicked in disgraceful shape, leaving sharp protrusions to gall the tire surfaces. It is the slip-shod, get-by, unskilled help that is so often obtained that needs a waking up by a demand for more careful service.

"I would like to see MOTOR AGE take up this subject in a way that would cause a reformation in this direction.

"Very truly yours,

"J. H. S."

Complaint similar to the foregoing can be traced in many cases to slackness in management. In other cases ignorance is the cause of improper use of tools and the idea that work on the car can be performed with a hammer and a pair of pliers. Movements in the direction of making better educational facilities available, will assist in eliminating conditions of this nature. A man who has had a good apprenticeship course under a capable instructor will know the proper use of tools.

A hammer is a good tool when properly used, but in the hands of the average half-baked mechanic, it serves the purpose of deforming or defacing the object on which it is used in nine cases out of ten.

Difficulties as above related, in getting proper service on various parts of the car, cause dissatisfaction in the use of motor vehicles and this reaction is bound to be felt in increased sales resistance in connection with the merchandising of cars and equipment. It is therefore up to the wideawake dealer to see that such conditions are eliminated and the sooner this is done the better it will be for all concerned.

One thing this correspondent has overlooked. That is that there are many excellent shops where they do not do the things he complains of and if he would start looking for quality, instead of price, probably his repairs would more nearly meet with the ideal that he appears to understand.



If a \$2.50 job is a comeback, and your net is 10 per cent, you've got to get \$25 more work to pay for that bad job.—SHERMAN.



Used Car Successes

AN interesting and important phase of the used car situation is brought out by a recent canvass in Pennsylvania by the National Automobile Dealers Association. Of the 474 dealers who completely filled out the questionnaire, 77 reported that their stocks had

been purchased at a less cost than the present market price.

Think of that, all of you used car pessimists. More than 16 per cent of the dealers who reported on this questionnaire were in a position to make money on their used cars. These men are real merchants.

These men are not pikers, either. Their reports totaled 875 cars, worth \$308,808, at current value. This is an average of 11.36 cars each and an analysis of the figures reported show that if they sold these cars at the prevailing market prices, they would make an average (gross) of \$46.46 on each car.

This merely shows what a man of nerve, with a real idea of what merchandising is, can do with this question that is so troublesome. These men are following the fundamental rule of merchandising that merchandise must be bought at a less price than it will sell for, if there is to be a profit.

Some years ago the story was told of a wealthy Board of Trade operator in Chicago who retired and afterward developed some very peculiar mental traits. As an amusement he bought a second-hand store and paid 50 cents for almost anything offered to him and immediately offered it for sale at 35 cents, or in that ratio. When asked for an explanation, he said that he had been on the profit side of business so long he wanted to get some figures on the loss side.

This story, told to business men, always brings a laugh. It is ridiculous, but how many automobile merchants have been doing the same thing? Yet they do not see the joke in their own case.

Recently a young salesman for a big production car in Chicago spent most of his time complaining that the salesmen for a competitive car were taking all of his prospects by bidding higher for the used cars. This young man had practically ceased to make an effort to sell, so strongly was he under the influence of this overbidding for junk.

Then came an evening when he went to a dance and there he met and danced with the stenographer for the rival sales establishment. He kidded the young lady about her establishment running wild and she laughed at him. She told the young salesman that her firm was not buying used cars except a very few restricted models and in any case where the price of this car went above the dealer's gross margin, the salesman had to assume the responsibility of selling the car.

This young man reported to his employer, the employer went to see his rival, found that the stenographer had told the truth and he and his sales force bucked up, talked sharply to the used car sellers who had been bothering them and sold several cars within the next week.

The trouble here was that these dealers did not work together in the dealer association and they took the word of every used car peddler who came along that the other dealer was a fool.

There is on the desk here a letter from an automobile dealer who says he is "forced to buy used cars at extravagant prices." If this is the case he should invoke the laws against peonage and prosecute the person or persons who are holding him in slavery. We know of no circumstances that will force a merchant to pay entirely unworthy prices for the merchandise that he is going to resell.

Why be a pessimist when 16 per cent of a large group of dealers are making money on their used cars?

1922 Production Is 2,576,000

Surprising Total of 225,000 Vehicles Made in December

Output Exceeds That of 1921 by 55 Per Cent—Also Greater Than 1920

NEW YORK, Jan. 9—With a production of 225,000 motor vehicles in December the year just ended, has rounded out the record breaking total of 2,576,000 which exceeds by 55 per cent the count in 1921 and beats the previous high water mark of 2,205,197 established in 1920.

This surprise party broke at the directors meeting of the National Automobile Chamber of Commerce today when James S. Marvin, head of the Traffic Department, made his report on production. The count of 2,576,000 for the year surpassed the estimate of 2,527,000 made by the statisticians a few weeks ago.

December's total really was responsible for the unexpected increase over this estimate, for a seasonal slump had been expected. While there were many factories taking inventory, some of the plants being closed down, still despite these the figures for the month went up to 225,000 which makes it the best December on record and only 5 per cent below November, 1922. That December cars were delivered is testified to by Marvin's report which shows that car-load shipments during the month totaled 26,900 as compared with November's 27,232. December drive aways were 27,500 as compared with November's 27,376, which bears out the statement that the railroads are meeting the situation and are operating well despite the rigors of winter.

Central Illinois Automotive Sales Boomed in Last Quarter

BLOOMINGTON, Ill., Jan. 8—Central Illinois automobile dealers are unanimous in the assertion that the volume of business in 1922 was far in excess of that of 1921. The estimate ranges from 10 to 25 per cent. The increase is considered remarkable in view of the setback due to the strike of the miners and railway shop crafts. The former tie-up did not affect the automotive business as much as that of the railroad shop men. As a large number of the Illinois roads settled with the strikers after a few months, the automotive business fairly boomed during the final quarter of the year and more than made up for the loss of the third quarter, due to the shop strike.

An outstanding feature of the year was the return of the farmer. He was out of business in 1921 and for the first half of 1922, but with big crops and a

jump in the quotations for farm products, the men who till the soil bought many cars, trucks and tractors.

The big gain in the mileage of hard roads in Illinois helped to pull the farmer into the sales agencies. As he took cognizance of the miles of concrete pavement, he felt a longing to get some good out of them, and his wife and children added their influence toward the buy. The holiday trade was also a big improvement over that of the preceding year. There were many Christmas presents of automobiles and also numerous inquiries about cars for April delivery.

In fact, the outlook for 1923 is so encouraging that the dealers of central Illinois are enthusiastic over a show and in every city which has a satisfactory building it is planned to stage an event of this kind immediately after the New York and Chicago events.

FIRESTONE, GOODYEAR INCREASE

AKRON, O., Jan. 8—After threatening to hold out against the general price increasing movement launched by practically all other rubber companies in the country, Goodyear and Firestone of Akron have announced increases commensurate with those of principal competitors.

Goodyear announced price advances ranging from 7 to 12½ per cent, effective Jan. 8. Firestone, although not having its lists of new price schedules ready for release, announced officially that the new prices will be made retroactive and effective as of Jan. 2.

URGES \$100,000,000 FOR ROADS

SPRINGFIELD, Ill., Dec. 6—In his message to the Illinois legislature, now in session here, Gov. Small recommended that legislation be instituted for a new bond issue of \$100,000,000 to complete the state system of hard roads. A bond issue of \$60,000,000 was authorized two years ago and a considerable portion of this has been expended in the construction of paved highways, including two concrete roads connecting Chicago and St. Louis. The governor declared that both bond issues could be retired with the proceeds of the annual motor vehicle license fees.

NO OLDS SHUTDOWN

LANSING, Mich., Jan. 7—There was no general shutdown this year at the Olds Motor Works for the annual taking of inventory. Due to the large number of orders on hand, the various departments were closed for a day and a half only, but the volume of production at the factory continued uninterrupted.

GRAY COACH INCREASED \$25

DETROIT, Jan. 8—The Gray coach line has been increased in price \$25, the present price being \$785.

Durant Announces Princeton Car in \$2500-\$3500 Class

Springs Surprise at New York Show With an Unheralded Addition To His Line

NEW YORK, Jan. 9—The Princeton, ranging in price from \$2435 to \$3675, was announced today by Durant Motors and models of the new line were placed before the public in the retail salesroom of the Lexington in the Fisk Building. The announcement was a complete surprise, for no one outside of the Durant organization knew that the new line had been planned. The Princeton will be made by the Durant Motor Co. of Indiana in the Muncie plant, and is an addition to the Durant line.

The Princeton is new from radiator to rear wheels and is in an entirely new price class from the Durant Six which lists at \$1650, whereas the Princeton is dropped into a higher priced division.

W. R. Willet will be the directing spirit in this new unit. Already he is president of the Durant Motor Co. of Indiana and for the last six months he has been developing the new job. He expects to be in production by April and he will build up an entirely new sales staff to sell the line.

HAYNES TO HAVE LIGHT SIX

NEW YORK, Jan. 8—The Haynes Automobile Co., planning ahead, announces that Chief Engineer Frank Nutt is working on a new and small six cylinder job which the company expects to market at about \$1000 for the open model and \$1500 for the enclosed. This will not be ready until about June and it will be a big production model. No details as to construction are given out.

With the addition of this new model to the lines, the company will have to prepare for factory expansion. The present capacity is 15,000 a year and the company expects to produce about 10,000 of the line already announced.

TWO EARL REDUCTIONS

JACKSON, Mich., Jan. 8—Prices have been reduced on the Earl sedan and brougham as follows:

	Old price	New price
Sedan	\$1,795	\$1,595
Brougham	1,795	1,595

The equipment remains the same in both cases and no changes are made in either body or chassis.

USED CAR SURVEY IN SIX STATES

ST. LOUIS, Jan. 7—Having completed a used car survey of the State of Pennsylvania, the National Automobile Dealers' Assn. has undertaken to make similar surveys with the aid of dealers in the states of Illinois, Indiana, Ohio, Iowa and New York.

Texas Starts Anti-Trust Suit Against Tire Company

Alleges That Contract With Dealers Requires That Fixed Process Be Maintained

AUSTIN, Tex., Jan. 8—Suit has been filed in the district court here by the State Attorney General's department, against the Pennsylvania Rubber Co. of America, for forfeiture of its permit to do business in Texas and for penalties in the sum of \$23,700 to \$711,000 for alleged violations of the anti-trust laws. The home office of the company is at Jeannette, Pa. It is the first anti-trust suit to be filed in Texas in five years.

The Attorney General's petition alleges that the company, which is a manufacturer of automobile and bicycle tires and inner tubes, has a contract with the Texas agencies named, in which it grants them exclusive territories and that, in addition, a price list is sent out for the guidance of the agencies in retailing tires which it is agreed under the contract must be followed.

J. G. Smith of Dallas is named as the general manager of the Pennsylvania Rubber Co. for Texas. The three agencies named as the ones with which the company has alleged illegal exclusive territory contracts are the Boynton-Calkins Co. of Corsicana, the Cunningham Tire Co. of Austin, and the Reliable Tire Co. of Dallas.

In addition to the judgment for penalties and forfeiture of the company's right to do business in Texas, the Attorney General asks for an order perpetually restraining the company from further observing or maintaining, or doing any act in furtherance of, the alleged combination and agreement made and entered into between it and the three agencies mentioned in the petition, or from continuing any agreement of like nature entered into with any other person, firm or corporation in Texas.

19 GRAY DEALERS NAMED

NEW YORK, Jan. 8—The Alberta Hirst Motor Co., Inc., New York distributors of the Gray car, report the following sub-dealers:

West Side Garage, Saratoga, N. Y.; Proper-Empire, Schenectady, N. Y.; Bowles Garage, Defreesville, N. Y.; Kenneth A. Newall, Jordan, N. Y.; J. P. Ryan, Cazenovia, N. Y.; R. E. Davis, Mexico, N. Y.; Guy Garrett, Fulton, N. Y.; H. G. Burton, Canastola, N. Y.; Thos. H. Robinson, Camillus, N. Y.; T. H. Glenn, Castorland, N. Y.; L. G. Moore, Copenhagen, N. Y.; L. H. Nealy, Liberty, N. Y.; Walter Jones, Patchogue, N. Y.; J. H. Silver, Glen Cove, N. Y.; H. B. Stedman, Oyster Bay, N. Y.; Geo. V. Sloat, Freeport, N. Y.; Watts Garage, Floral Park, N. Y.; Bucken & Neip, Rockville Center, N. Y.; G. S. Horton, Cedarhurst, N. Y.

ROCKFORD CONSIDERS A SHOW

ROCKFORD, Ill., Jan. 8—Automobile dealers of Rockford are considering a winter show but are confronted with the annual problem of a suitable build-

ing. Last winter's display was given in the Shrine temple, but the space was inadequate. The dealers are considering three locations—the Shrine temple, Inglaterra and the gymnasium of St. Thomas school. The show, if the majority of the dealers favor such an event, will be staged the last week of February or the first of March.

CANADA BUILDING GOOD ROADS

TORONTO, Ont., Jan. 8—From 1919 to the end of the present year, highway projects to the cost of \$27,542,456 have been undertaken in Canada. Of this the Dominion will pay \$11,016,982, as 40 per cent of the cost. Roads to a mileage of 4819 are being constructed. The mileage and cost by provinces is as follows:

Prince Ed. Isl.	181	\$324,565.
Nova Scotia	207	\$2,251,259.53.
New Brunswick	1237	\$2,950,600.
Quebec	237	\$2,638,641.75.
Ontario	606	\$11,292,798.70.
Manitoba	764	\$3,478,902.15.
Saskatchewan	1229	\$1,667,090.01.
British Columbia	355	\$2,938,598.75.
Total	4819	\$27,542,455.89.

OLDSMOBILE DEALERS TO MEET

LANSING, Mich., Jan. 6—Final arrangements for the annual mid-western Oldsmobile dealers' dinner to be held in Chicago, Jan. 31, are being completed by the Olds Motor Works. The dinner is to be held at the LaSalle Hotel, the headquarters of the Olds delegation, and more than 500 are expected to attend. The speakers will include Pierre S. duPont, president of the General Motors; A. B. C. Hardy, president and general manager of the Olds Motor Works; Guy H. Peasley, general sales manager, and W. V. Faunce, Chicago distributor.

TIRE MAN STRICKEN

AKRON, O., Jan. 8—I. R. Bailey, vice-president and sales manager for the Seiberling Rubber Co., and one of the oldest and best known men in the rubber industry, was stricken with paralysis New Year's day while preparing to leave a few hours later for California to spend the remainder of the winter. Bailey, who is 55 years old, formerly was with the Diamond Tire Co. When it merged 20 years ago with Goodrich he joined Goodyear and resigned as assistant sales manager in 1921 to join the Seiberling company.

KEWANEE, ILL., SHOW IN FEBRUARY

KEWANEE, Ill., Jan. 8—The annual show of the Kewanee Automobile Dealers' Association will be given on Feb. 8 to 10, at the armory. The leading merchants will co-operate and stage a style show in conjunction, displaying the latest models in wearing apparel. It is hoped to make this a three county affair and the public will be invited from Stark, Henry and Bureau counties.

Distributing Methods Not Likely to Be Much Changed

Distributorship vs. Factory Branches; Good Organizations Sought By All

NEW YORK, Jan. 6—While there is no tendency indicated on the part of manufacturers to change materially their distribution methods, there is a tendency to demand better distribution methods on the part of the distributor. There is no place in the industry for a broker of cars, show sentiment declares, but there is a place for the wholesaler who works and actually does distribute the cars that pass through his hands.

Sales Organizations In Demand

Distributors who can build up and maintain dealer organizations which systematically fulfill the sales requirement of any factory in any given district have a definite place and will be sought after by all companies. This is no easy job, but there are no more easy jobs in the industry and never should have been, sales executives declare.

As a general thing, the industry is not giving serious thought to the question of distributorships versus factory branches and it is certain there will be no substitutions of the latter anywhere unless for failure of the former to function satisfactorily. Sales as a general rule are coming through in such volume as to leave little to be desired and for that reason there will be evidenced an attitude of leaving well enough alone.

PREPARE FOR SHOW AT SPRINGFIELD, ILL.

SPRINGFIELD, Ill., Jan. 8—The date for the annual show of the Springfield Auto Dealers' Association has been fixed for Feb. 22 to 24 at the state arsenal. The days assigned were selected by the adjutant general of the state, who controls the building. The motor car dealers are entirely satisfied with the date. General Manager Basil Ogg will have for his assistants C. H. Edmonds, R. E. Hatcher and A. J. Dohle. The decorations will be in charge of W. C. Henry. Twenty-five firms have asked for space which includes practically every firm in the city and will be the largest number ever represented at such an exhibition in the capital city. Manager Ogg has been in Chicago arranging for some vaudeville talent to appear during the show. This will be the fourth show to be put on by the dealers of Springfield. There is now the utmost harmony and co-operation.

CORRECTION

In last week's number of MOTOR AGE a mistake was made in the advertising of Gill Mfg. Company, appearing on pages 130 and 131. This company's special ring was listed at 40 cents, whereas it should have been 50 cents.

National Motors Plans to Manufacture All Its Units

Some, However, Will Be Purchased Until Factories Are Organized for Production

NEW YORK, Jan. 5—In an interview with representatives of the Class Journal Co. here today, T. C. Brandle, vice-president in charge of merchandising of the newly named National Motors Corp., stated that it will be the policy of this company to manufacture practically all the parts entering into the three six-cylinder chassis which constitute the National line, although some parts and equipment will be purchased until such time as the various plants of the company are organized for production. Examples of equipment to be made at once within the organization are the gearset, axles, clutch and steering gear used in the new light six. These will be manufactured at the Covert plant of the National Motors Corp.

Brandle said further that the Recording & Computing Machines Co. plant in Dayton, owned by National Motors, will manufacture starting, lighting and ignition equipment primarily for use on National cars, but also for general sale to the trade. This equipment has already been developed under the name of Ohmer and is said to be ready for quantity production.

It is the plan of National Motors to sell its cars through distributors and dealers throughout the country. Brandle stated that within a year assembly plants will be established in Oakland, Cal., and also at some point in the east yet to be selected, while a general warehousing plant may also be established at some point convenient to the various factories owned by National Motors.

New Six Cylinder Stutz to Sell at \$1995 and \$2550

NEW YORK, Jan. 6—The new six-cylinder Stutz, which makes its debut at the show, will list at \$1995 for the phaeton and roadster and \$2550 for the five passenger sedan. The prices were set at a conference of Stutz officials held at the New York residence of Charles M. Schwab, which was attended by Eugene V. R. Thayer, chairman of the board of directors, and Carl Schmidtlapp, vice-president of the Chase National Bank of New York, both of them Schwab's associates; W. M. Thompson, president and general manager of Stutz; Fred Wilson, sales manager and Herbert Hyman, advertising manager.

In addition to setting the list on the six cylinder, the conference also discussed production, the decision being to set the mark for 1923 at 10,000, of which about 8000 will be sixes. Inasmuch as 1200 four cylinder jobs were sold in 1922 it was thought 2000 can be sold this year.

No changes in prices on the four cyl-

inder will be made, but a new model has been added or rather an old one revived—the Bulldog, a four passenger de luxe open car which will sell at \$3115. The remainder of the Speedway Four series will list as follows: Phaeton, \$2640; roadster, \$2450; standard sports, \$2790; Bearcat de luxe speedster, \$2765; four passenger coupe, \$3490.

All Rickenbacker Officers Reelected—5000 Cars Made

DETROIT, Jan. 6—All officers and directors of the Rickenbacker Motor Car Co. have been returned to office at the first annual meeting of the company. These are B. F. Everitt, president and general manager; E. V. Rickenbacker, vice-president and director of sales; H. L. Cunningham, secretary-treasurer; R. M. Hood, assistant general manager in charge of purchases; C. M. Tichenor, factory manager, and E. R. Evans, chief engineer.

The officers comprise the board of directors.

The company is without any bank indebtedness, President Everitt said, and all bills have been discounted. Starting in January a year ago, Everitt said, the company produced 14 cars and in 90 days were on the right side of the ledger. Every month since has shown a profit he said, and a total of 5000 cars were built during the year. Plans for the new year contemplate a greatly increased output.

The company has about 6000 stockholders.

McFARLAN PRICES LOWER

CONNERSVILLE, Ind., Jan. 7—A new price list, considerably lower than the 1922 list, is announced by the McFarlan Motor Corp. on the 1923 line of McFarlan cars. The roadster, for instance, is now \$5400 instead of \$6300 and the coupe is \$6750 instead of \$7500. The complete new list follows:

2-pass. roadster	\$5400
4-pass. sport	5600
7-pass. touring	5700
Town car	6900
Close coupled sedan	6720
Coupe	6720
Knickerbocker cabriolet	9000
Sport sedan	6600
7-pass. tour. sedan	6810
4-pass. tour. sedan	6720
Suburban sedan	7000
Limousine	6900
Landaulet	8500
Chassis	4550

NEW REO AT \$2185

LANSING, Mich., Jan. 7—The new Reo 4-door brougham being shown for the first time at the New York show is priced at \$2185.



B. F. Everitt

Medium Priced Cars Sold Well in Canada in 1922

Automotive Trade in Dominion Showed Great Improvement, but Farmers Are Not Buying

TORONTO, Ont., Jan. 8—The year in the motor industry in Canada has been a good one. Sales have been exceptionally large for all the lower priced cars. Even the moderated-priced cars have met with a ready sale. Only the high-grade cars—those ranging from \$5,000 to \$10,000—have experienced any difficulty in finding purchasers.

The public in the Dominion as a class appears to have come to the conclusion that cars ranging in price from \$800 to \$2,800 are good enough for all practical purposes, and 10 of these are sold where one of the more expensive finds a market.

The Toronto sales manager for one of the most popular of the lower-priced cars said that the company's agents throughout the Province of Ontario had had on the average taken 85 per cent of their quota of cars, while others have run up as high as 150 per cent of their requirements.

The difficulties which confront the motor trade are largely psychological. The good crops which the farmers experienced this year were only sufficient to provide payment for current obligations and the rural community in consequence is not in a humor to spend money on luxuries. Where cars are in commission the old ones are being made to do; new cars are not being bought to any extent in the rural sections. Even at that, trade in the motor world is gradually coming back, and a healthier condition is believed to exist than was the case at this time a year ago.

Ford Figures for Domestic Plants in November Gain

DETROIT, Jan. 5—Final figures for Ford domestic plants in November show a production of 121,968 cars and trucks. The production of the six foreign plants of the company was 6,354 and this with an output of 3,163 in the Canadian plant, gave a total output of all plants of 131,485. The tractor plant at the River Rouge built 5,113 tractors in the month. Total Fordson production for 11 months, including the Cork plant, was 63,007. The same period in 1921 totals 36,469.

Four of the six foreign plants built more cars in November than in October, these being Buenos Aires, Copenhagen, Cadiz and Sao Paulo, the Canadian output also represented an increase. Production in each of the foreign plants was, Manchester 1,569; Buenos Aires, 1,490; Copenhagen, 1,200; Bordeaux, 964; Cadiz, 697; Sao Paulo, 434.

Ford River Rouge plant in 1922 required 652,000 tons of coal for the production of 496,000 tons of coke for its ovens.

All California Commercial Automotive Interests United in One Organization

Conference With 3000 Members Has for Its First Object the Establishment of a Just and Reasonable Motor Vehicle Act

OAKLAND, Cal., Jan. 7—Motor car dealers, garage and repair men, and operators of motor truck, stage and bus lines, that is to say, all dealers in and users of commercial vehicles on the highways of California, to the number of more than 3000 have formed the California Automotive Conference, the first organization of its kind in the United States. This is designed to be a permanent association by and for the automotive industry throughout the state to promote and protect the interests of the firms and men in the industry.

The first work of the conference, being planned in January when the organization began to function, is the establishment of a Motor Vehicle Act which shall work justice to all users of the highways for commercial purposes, and to prevent legislation inimical to the industry, such as unjust taxation, misdirection of funds obtained from taxation, and limitation of weights to be carried over the highways to such an extent that motor truck and stage lines cannot operate profitably.

All those interested in the automotive industry—aside from owners of automobiles for personal use only—are eligible to membership, and some idea of the interest aroused by the new organization may be gained from the fact that although it was formulated only in December and fully organized in January with no entrance fees or dues of any kind, there is now approximately \$5000 in the treasury, contributed by the members to help to carry out the program of work outlined.

Officials are Frank Fageol of Oakland, president; J. A. Stoner, Los Angeles, vice-president; Robert Martland, Oakland, general manager; F. H. Chestnut, San Francisco, secretary; David Smith, Los Angeles, assistant secretary; W. E. Travis, San Francisco, treasurer. All these officials serve without salaries.

The conference purposes to maintain a permanent organization with the object of protecting all branches of the industry and to further a general plan of developing highway transportation. Up to the present, the activity of the conference has been taken up largely in perfecting the organization, and, in view of the approaching session of the legislature, developing a legislative platform, so that the industry may present a consistent and united opinion as to what is necessary for the future development of highway transportation in California. Only such elements as are indispensable to the present necessities and future development of the automotive industry have been incorporated in this policy.

The conference goes on record with the statement that funds necessary for the maintenance of the highways should



Robert W. Martland, manager of the new California Automotive Conference, just organized with more than 3,000 members to foster and protect the interests of dealers and owners of commercial motor vehicles operating on the highways of California

be derived from a tax—other than a gasoline tax—levied proportionately upon all the users of the highway. The conference also holds that passenger and property carrying motor vehicles, operating under a certificate of public necessity and convenience, issued by the railroad commission and rendering substantially similar service to that rendered by the steam and electric railroads, should come squarely within the provisions of the present state law governing steam and electric railroads, and pay directly to the state, in lieu of other taxes, a proportion of their gross earnings, determined on the proper basis of valuation. This is the same provision now applicable to all other common carriers in California, and will be presented to the legislature as equitable and consistent, by the representatives of the California Automotive Conference at the next session of the lawmakers in Sacramento.

Aside from the above projects, the conference will oppose all badly considered, unnecessary and ill-advised legislation affecting the interests of the owners and operators of commercial motor vehicles in California, or detrimental to the general interests of the automotive industry here. The conference plans to maintain offices in Sacramento during the sessions of the legislature, though its headquarters are in Oakland. Later on, plans are being laid to conduct a general campaign of education throughout the state, calculated to convince the public of the necessity of highway transportation as a forward step in the economic progress of the state.

Indiana Trade Associations Now Oppose Gasoline Tax

New Policy Adopted at Meeting of Representatives With Hoosier Motor Club

INDIANAPOLIS, Jan. 6—At a meeting of representatives of the Indianapolis and Indiana Automotive Trade Associations with members of the Hoosier Motor Club and the state club held here last week it was decided not to oppose additional license fees, which will be laid before the legislature, but the group went on record against the imposition of a gasoline tax, pleading that there would be excessive waste in the collection of such a tax.

This position is counter in some respects to the action of the recent state convention of the Indiana Automotive Association, which did not go on record against either of these forms of motor vehicle fees or taxes for the reason that the present road situation in Indiana demands more funds for the state highway department.

Increased Fees Needed

Spokesmen for the club members admitted that the increased license fees were needed by the state highway department. It was pointed out that the present fees are 15 cents per hp. lower than the average state, and inadequate to permit the taking up of \$11,000,000 of Federal aid allotted to Indiana at present and for the next three years.

At a meeting of the Allied Motor Commerce, D. C. Barnett, secretary of the Indiana Automotive Trade Association, called attention to the fact that the state trade body had not gone on record against the gasoline tax at its Dec. 12 convention, but had insisted that any additional motor vehicle license fees or taxes should be used solely in construction of state highways.

NEW STEPHENS PRICES

MOLINE, Ill., Jan. 7—The Stephens Motor Car Co. announces the following list of prices on the new line of Stephens cars for 1923:

Model		
12-2-pass. Roadster	.....	\$1345
15-5-pass. Touring Sedan	.....	1595
16-5-pass. Touring	.....	1295
18-5-pass. Sedan	.....	1895
24-4-pass. Foursome with wood or disc wheels	.....	1985
24-4-pass. Foursome with wire wheels	.....	2085
26-7-pass. Touring	.....	1685
27-7-pass. Sedan	.....	2385

7500 MOONS IN 1922

ST. LOUIS, Jan. 6—Announcement is made by the Moon Motor Car Co. that its 1922 production was 7,500 cars, approximately doubling the 1921 production. One feature of the 1922 business was the fact that the company's turnover was between ten and eleven times.

Capital Expansion Prepares For Great Automobile Output

Transfer of Surplus Funds Puts Factories in Position to Meet Increased Demands

DETROIT, Jan. 7—Transfer of millions of dollars from surplus capital account by many industrial companies during 1922, among which are listed many automobile manufacturing companies, will result in large expenditures for plant and equipment improvement, in the opinion of executives here, and as such will have a pronounced influence in improving general business conditions during the year.

Automobile companies are taking advantage of improved financial positions due to such transfers to bring their plants and equipment to the highest point of perfection. Much of this work is being done quietly in expectancy of largely increased production due to new machinery installation, and before the new selling season is opened these factories will be in position to make marked increases in former records.

With newer and more modern type machinery making for greater production and consequently lowered manufacturing costs, the earning capacity of these companies will be greatly increased and there is practically certain to be price concessions to take up the increased output. The balance between the price reductions and the increased efficiency of production, however, will make for higher returns for the factories.

The improvement of plans and equipment is not limited to those companies which have transferred funds to capital account by stock dividends, but is more marked in their cases, particularly with respect to plant equipment. Practically all of the larger plants are making additions to their factories and millions of dollars will be spent by the industry in total in preparation for increased production this year and in the future.

Truck Transportation Shown By Oregon Dealers' Film

PORLTAND, Ore., Jan. 7—Oregon's truck transportation film, designed to show the history of freight transport from the days when slaves carried the world's goods upon their backs to the present day of motor vehicles, has been completed and was displayed in Portland this week.

The film, known as "Filling the Nation's Bread Basket," was made under the auspices of the truck department of the Automobile Dealers' Association of Portland, composed of all the leading truck dealers of the city, and will be shown to school classes, chambers of commerce and other bodies throughout the state. Eastern associations have expressed keen interest in the picture, and

it is expected that later prints will be shipped east for showing.

Work on taking the picture was mostly done last summer with Jesse Sills, well known motion picture photographer, in charge. Scenes were snapped in eastern Oregon and in the Willamette valley, and show trucks aiding the farmer in harvest, hauling wheat, handling road construction work, hauling logs and other kindred jobs which the motor trucks are called upon to perform in Oregon, a state in which the railroad mileage is relatively low and industry is more dependent upon the truck than in most states.

Dealers Should Watch Out For a Swindler Like This

FORT WAYNE, Ind., Jan. 6—A swindler believed to have been the same one who made away with a new Oakland car from the salesroom of the E. W. Steinhart Ft. Wayne Co., after he had been hired as a salesman, has been heard from in Idaho. P. H. O'Reilly, proprietor of a retail automobile agency at St. Maries, Idaho, has written the Fort Wayne company that this man appeared there Dec. 7 and requested O'Reilly to identify him to enable him to cash a check on a Canadian bank for \$553. The stranger is said to have exhibited a bill of lading for a car of household goods and two automobiles, representing that he was moving from Montana to the Idaho town. His check was endorsed by the Idaho dealer and subsequently it came back to him as worthless.

The name this man gave in Fort Wayne was C. H. Calg. He was about 40 years old, 5 ft. 6 in. tall, with blue eyes and light complexion and weighing between 135 and 150 lbs. His hair was thin on top of head and he walked with a slight limp and a stoop. He talked rapidly with an eastern accent. The Oakland car he took here was a touring car, serial No. 9307 and engine No. K-9722. It was equipped with Firestone cord tires, including one extra, and a Stafford spring front bumper. The rear left corner had a small dent caused by backing into a truck.

FORD EXPANDS AT LOUISVILLE

LOUISVILLE, Ky., Jan. 7—Construction work on a \$50,000 factory addition to the Ford Motor Co.'s plant at 2500 S. Third street has been started. The building will be completed March 1. The new building will be of the standard one-story brick and steel type construction being erected at all plants under the Ford supervision and will cover a floor space of 22,000 sq. ft.

Officials of the company said that the building was being constructed to alleviate crowded conditions within the present plants, and declared that the move would probably be followed by an augmented working force and an increased output of the Louisville assembling plant within the next 30 days.

Bright Automotive Outlook In Toledo for the New Year

Dealers Ready for Greater Sales as Factories Plan Increased Production

TOLEDO, O., Jan. 7—Toledo is looking forward to a big year in its automotive industry.

Employment managers at a recent meeting said there would be a demand for approximately 25,000 skilled mechanics to go to work here in the first two months of the year. As practically all of the plants have been operating above normal for this time of the year, this will mean a large increase in the production of automotive products here.

The Willys-Overland Co. plans to produce 45,000 cars in the first quarter and have approximately 15,000 men at work by April 1.

The Toledo Chevrolet Co. is building an addition to its plant. Bock Bearing Co. notes enlarged demand for its products, with orders for February delivery increasing over January.

The Electric Auto-Lite expects to increase its force by several hundred employees after it gets under way following two weeks' period for inventory.

The Tillotson Carburetor Co. has the largest production schedule in its history marked out for 1923.

Ford Plate Glass Co., which does considerable business for automobile companies, is also remodeling one of its plants and preparing for a big increase in windshield business.

General business conditions are excellent and most of the dealers are set up to do a big year's business in sales. Several have placed commitments for the year which are far above any other.

Traffic Violators Get Public Lesson in How to Drive

PORTLAND, Ore., Jan. 6—Judges and traffic officials all over the country are striving for that form of punishment that will really be effective against the speed maniac and the habitual traffic law violator. Here is the suggestion of the municipal judge of Salem, capitol city of Oregon and with some 10,000 inhabitants. The judge has already put the plan into effect and is more than getting away with it.

All traffic violators will be taken for a ride through the business district and taught how to drive, announced Judge Unruh, in starting his campaign to reduce accidents. When the first crop of offenders was ready they were gathered into a large automobile, placed where they could be easily seen and recognized and then taken for a slow ride through the city, with stops being made at important corners for demonstrations on how to drive. A great placard on the car announced to the world that "these men are being taught the rules of the road."

Oakland Company Extends Mileage Guarantee Plan

Asserts Crankshaft and Connecting Rod Bearings Should Run 40,000 Miles Without Adjustment

PONTIAC, Mich., Jan. 7—The Oakland Motor Car Co. makes the following announcement, which will prove of interest to all automobile dealers:

"As a result of one year of success with their original written 15,000 mile guarantee against excess oil in the combustion chamber—which has cost the company but a fraction of a cent per car—the Oakland Motor Car Co. now announces a further mileage plan, the most comprehensive ever offered over the signature of any automobile company.

The 15,000 mile guarantee was the first step to give the public a definite gauge—a mileage gauge—by which to judge automobile value.

"Due to the success of this guarantee and exhaustive factory, road and laboratory tests, backed by the experience of the thousands of owners of these cars, the company now offers an even more extensive "mileage basis plan" on their 1923 models.

The main features of this new unique plan are as follows:

1. The Oakland main crankshaft bearings will run 40,000 miles or more, without adjustment or replacement.

2. Oakland valves will function properly for 15,000 miles or more without grinding.

3. Connecting rod bearings will run 40,000 miles or more without tightening or repairs.

4. Cylinders, pistons and piston rings will give no trouble for at least 15,000 miles. The special written guarantee now in effect covering this mileage will be continued in the 1923 cars.

5. The cars will average, in daily use, from 20 to 25 miles per gallon of gasoline.

6. Tires will average from 15,000 to 25,000 miles.

7. Transmission, axles, frames, steering gears, body and other major parts will endure for the life of the car."

These figures, according to Benjamin Jerome, chief engineer, are minimum calculations, under ordinarily proper care, and in every instance the items enumerated can reasonably be expected to give the owners even greater mileage than the engineering department estimates.

"This 'mileage basis plan' has been announced by the Oakland Motor Car Co. after due deliberation," Jerome said, "due to its firm belief that the average motor car purchaser is entitled to know what an automobile should do."

"The theme of every motor car owner, in conversation with his car-owning friends," he explains, "is mileage. He talks of gasoline mileage, oil mileage, bearing mileage or how long his car will run before it is necessary to have his

valves reground. He always speaks in terms of mileage.

"With this thought in mind, the Oakland company decided, after many tests, that they would present to the public a fair plan, showing just what they might expect of these cars.

"If the instructions given with the cars are followed, our set of figures will prove conservative. We have understated the case, except of course in those instances when the cars are actually abused in driving.

"It is also worthy of note that this mileage plan covers completely the most essential parts of the car—the motor, for instance, the very heart of the car—and particularly those parts which in general have given motorists most trouble."

Trade Associations Are Called "Business Organizations"

WASHINGTON, Jan. 7—The Bureau of Internal Revenue has made a ruling that the action of the internal revenue collector in the Baltimore district in taxing dues and initiation fees of the Baltimore Automobile Trade Association was erroneous. The former collector in Baltimore held that the association was a social one rather than a business organization and that dues and initiation fees should be subject to the 10 per cent tax levied upon such revenues of clubs and other social organizations.

The department's ruling definitely places automobile trade associations in the class of business organizations.

RECEIVER FOR LIBERTY

DETROIT, Jan. 7—The Liberty Motor Car Co. was placed in the hands of the Security Trust Co. as receiver in the Federal court on petition of the Parish Manufacturing Co., which claims \$5,107.03 debt. In the petition, assets are placed at \$2,400,000, excluding good will, and indebtedness \$1,500,000. The petition declares the company has made several ineffectual attempts to reorganize.

A statement by President Percy Owen of Liberty declared the company's difficulties were due to its inability to take advantage of the facilities of its new plant. This was occasioned principally, he said, by the failure of large parts makers to make deliveries in quantity ordered and finally brought about a condition which necessitated complete reorganization of the company.

Gross receipts of the company were declared in the petition to have totaled \$2,700,000 last year.

G. M. C. PLANT RESUMES

PONTIAC, Mich., Jan. 6—The General Motors Truck Co. this week resumed operations on a full time basis after being shut down one week for the annual taking of inventory.

No Begging For Funds at N.A.D.A. Convention: Vane

Dealers' Body Now Well Established and Able to Devote Time to Constructive Work

ST. LOUIS, Jan. 7—The question of further financial support of the National Automobile Dealers' Association is one that will not be taken up at the Sixth Annual Convention of that organization in Chicago, Jan. 30 and 31, at the Hotel La Salle, according to an announcement by General Manager C. A. Vane.

"The 1923 convention will be one convention that members and their guests can attend with the assurance that they will not spend 90 per cent of their time in the convention hall listening to appeals for further financial support of the organization," Vane said.

"We have but two days to take up the constructive work of the organization for the coming year and we intend to use every minute for the discussion of such work, and let the matter of finance take care of itself. In the past three years we endeavored to keep the financial discussions at the conventions within certain limits but had difficulty in stopping them when the allotted time was up. In order to prevent a recurrence the only mention of finance that will be made will be included in the reading of the secretary's annual report.

"Such discussions were in order while the association was building and at times even struggling for existence, but it has now reached a point where its services are sought by the real automobile merchant who intends to continue and expects to prosper in this business. Only such a man appreciates the worth of an organization of this kind, and only such a man is admitted into the organization, because the requirements of membership are such that only the real business man can become a member.

"During the past year the association has attracted 700 quality merchants with its ONE OF A THOUSAND program and with the cooperation of men of their type the association can make a thorough study of the automobile business and learn just why capital invested in the automobile business should work so hard and earn so little as compared with that invested in almost any other business you can think of."

Reduced railroad rates for the convention are available only to members. Certificates must be used to get the reduced rate. These are being supplied only from the St. Louis headquarters of the association.

The schedule of sessions for the convention is as follows: Saturday, Jan. 27, 10 a. m., director's meeting; Monday, Jan. 29, 10 a. m., opening session of convention; Monday, 6 p. m., fifth annual banquet; Tuesday, 10 a. m., concluding session of convention.

Great Production Volume Opens 1923

Brief Holiday Closings Are Followed By Big Preparations

Dealer Organizations Strengthened Greatly By Bigger Companies

DETROIT, Jan. 6—The industry is opening the year 1923 with the greatest production volume it ever has known. After brief closings during holiday week for inventories, factories are tuning up preparatory to entering upon the heavy manufacturing schedules of this new year. January schedules, though not representing capacity operations in any plant, are heavier than December, and are far in excess of operations at this time a year ago.

Schedules in almost all plants are from 20 to 40 per cent in excess of last year's totals and so far as manufacturing alone is concerned, there are ample facilities to meet the increases. Dealer organizations have been strengthened greatly by the big companies, but their gains have been largely at the expense of smaller companies.

As a general rule, operations in all plants will run during January at about 60 to 70 per cent of the anticipated volume in the spring and summer months. Totals will be stepped up gradually until by March, capacity operation should be in swing. Much of the early shipping will be preparatory to the opening of spring business, but large demand in practically all parts of the country has kept stocking to a much lower figure than customary. There is no stocking of enclosed cars; on the contrary factories are behind on orders in this class. Body deliveries are better and are improving all the time but demand continues to exceed supply. Factories which have developed sport and special models find that they have been important factors in keeping alive an open body during the winter. Continued demand for sport models, however, would interfere seriously with large production later.

Ford Retail Sales

Ford retail sales in the United States again will exceed 100,000 in December and January business will be equally as heavy. Production totals will tally closely with this figure and are now in comparison with earlier months in the year because of the heavy enclosed car business. It is to speed closed car production that the new Chicago plant of the Ford company is principally designed.

Chevrolet is at capacity of its present plants and is shipping from 1,200 to 1,500 cars daily. With the completion of its new plants early in the year, the company will have capacity for 2,500 cars daily. This includes both Superior and the new "copper cooled" lines.

Buick is building from 650 to 750 daily in all plants, Studebaker 500 to 600, Dodge about 600 daily, Hudson-Essex about 250 daily, Maxwell-Chalmers about 200 daily, Paige-Jewett about 150 daily and Hupp is operating at about the same capacity. Oakland, Oldsmobile, Reo and Dort are building about 100 cars daily.

In the higher priced cars, Cadillac is operating in excess of 100 daily. Packard is increasing its production and soon will be operating close to the 100 daily mark. Wills Sainte-Claire is preparing to resume production on a large scale but probably will not be able to do this until after Feb. 1. In the meantime the company is operating on a sales basis strictly. Roamer is getting into production on its light six models and is meeting fair business on its larger product.

Production of the Star car at the Lansing plant of Durant Motors is increasing steadily and now is close to 200 daily. Production will be increased to a minimum of 300 daily, which figure will also represent the capacity of the new Star plant at Flint which will get into operation early in the summer. Durant four models are running at the rate of 50 to 100 daily.

Rickenbacker is increasing its production to the 50 daily mark and will exceed this figure as the season progresses. Columbia is building from 50 to 75 daily. Earl Motors is starting on its 1923 schedule and soon will be building about 50 daily. Gray Motors is building in excess of 100 cars daily and is planning to increase to about 200 daily at once.

WAGNER RECEIVERSHIP DISMISSED

ST. LOUIS, Jan. 5—Circuit Judge Hall has dismissed a petition for receivership filed Nov. 18 by several stockholders of the Wagner Electric Mfg. Co., and also dissolved a temporary restraining order which prohibited final ratification of the deal reorganizing the company Aug. 11, last.

PHILADELPHIA TRADE IMPROVES

PHILADELPHIA, Jan. 6—Automobile accessory and tire dealers here generally report trade improved somewhat in the last few weeks. Skilled mechanics are scarce and there is little unemployment. Sales of enclosed cars continue good. Used cars are moving slowly.

PONTIAC SHOW JAN. 10-13

PONTIAC, Mich., Jan. 6—The Pontiac Automobile Show will open in the armory on Jan. 10 and run through Jan. 13. It is anticipated 30 makes of cars will be displayed, under auspices of local dealers.

BUICK PRODUCTION RECORD

DETROIT, Jan. 5—All previous records for production of automobiles by the Buick Motor Co. were exceeded on Dec. 28 when the Buick plants at Flint and Detroit built 825 automobiles.

United Motors Services Has Completed Flat Rate Schedule

Plan Will Cover Work on Delco, Klaxon and Remy Electrical Equipment

DETROIT, Jan. 7—The adaptation of the principles of the flat rate repair system to electrical service has been completed by United Motor Service, which has put into operation in its twenty-one branches a flat repair schedule. This covers maintenance repair operation on Delco, Klaxon and Remy equipment. The same schedules are in effect at all of the direct branches of the United Motors Service in the United States and the system is now operated so that maintenance repair at the rates established is available at these branches to any car owner or the trade.

Unlike the operation of flat repair system usual in complete automobile maintenance, the schedules as adapted to electrical practice are designed to give the customer a flat price on his job, which includes both repair charge and material. A uniform price is provided on the same job no matter with which branch he deals and a price based exactly on the conditions of the job and the work to be done, not a general average of similar jobs as in the past. Instead, the price is made up by the addition of unit prices. This has been made possible by a very complete study of the maintenance problems involved and a sub-division of the jobs down to a basis where a customer requiring work done on a small part will not have to pay for work on the entire assembly or sub-assembly of which this unit is a part.

From a psychological standpoint, in making the price for the flat schedule, the term, "labor" has been avoided. Instead of charging the time of taking off and putting on as labor, the term, "take off and put on" price is used instead. In other words, into this take off and put on price has been figured the time of the workman and its share of the overhead or burden of the establishment. Whereas an owner might object to a charge of \$2 an hour for labor, he will not object to a \$2 take off and put on charge when he is told that that is what it costs the shop to do the work, plus a small profit.

TAKES OVER PIEDMONT

BIRMINGHAM, Ala., Jan. 6—James T. Driver, vice-president and general manager of the Preston Motors Corp. of Birmingham, has been made fiscal agent for the Virginia Motors, Inc., of Lynchburg, Virginia. This concern has been formed to take over the Piedmont Motor Car Co. of Lynchburg.

Locomobile Takes Title to Durant Long Island Plant

Will Be Known As Flint Motor Company Division of Durant New Jersey

NEW YORK, Jan. 6—The Locomobile Co. of American has taken title to the Durant plant in Long Island City and will operate it as the Flint Motor Co. division. The Durant Motor Co. of New York, which heretofore has operated the Long Island City plant will be dissolved and its assets absorbed by the Durant Motor Co., of New Jersey.

The Long Island City plant was the first factory opened by Durant Motors, Inc. It was used chiefly for the production of Durant fours but Stars also were manufactured there until operations were transferred to the Elizabeth plant. This factory will be used to supply Flints for the eastern market.

The Locomobile company will take the full production of Flints from the new Flint, Mich., plant for distribution in the central and western territories.

The Mason Truck Co. also will be a division of the Locomobile company. Operations will be carried on in the Mason plant at Flint and also at the old Riker truck plant at Bridgeport, Conn., from which the eastern market will be supplied. Truck production at the Flint plant will approximate 100 this month and it will gradually be expanded to 30 a day.

Add to Main Plant

The Locomobile company has begun the construction of an addition to the main plant at Bridgeport which is operating at capacity. Production facilities now are inadequate and when the addition is complete it will be possible to eliminate overtime in several departments.

This move will make the Locomobile unit a most important cog in the Durant machine and also add another star to the Durant executive staff in the recognition of Col. E. H. Havens who will head this unit. Col. Havens was receiver for Locomobile and brought order out of chaos so successfully that W. C. Durant has recognized his ability by naming him vice-president in charge of operations of Locomobile, Flint and Mason.

A certificate has been filed at Dover, Delaware, increasing the capital of Star Motors, Inc., from 1,000,000 share of no par value to 2,000,000 shares of no par value. It is understood a large part of the proceeds of the sale of this stock will be devoted to the development of a national sales and service system.

The Elizabeth plant now is turning out 100 Stars daily and has gone into production on the Durant Four. The sales department of the eastern division of the Durant enterprise has been transferred from Long Island City to Elizabeth.

A special train will be run from New

York, Jan. 9 to take Durant distributors here for the show, to Elizabeth for an inspection of the plant. The following day there will be a double celebration at the Elizabeth factory. It will mark the thirty-sixth anniversary of F. W. Hohensee's affiliation with W. C. Durant as well as the formal opening of the plant. W. C. Durant himself will take a large number of executives in his various companies to Elizabeth on a special train Jan. 11 for an inspection of the factory and will entertain them at luncheon there.

Suitable Show Building Is Bloomington Dealers' Problem

BLOOMINGTON, Ill., Jan. 6—With the decision of the automotive dealers here to stage the annual show of cars in February, arises the problem of a suitable building. The structure, which has served to display the cars in years gone by, has never suited the dealers, but they have been forced to take what was available and sigh for something better in the years to come. Doubtless this same problem confronts the dealers of many other cities of the state. Springfield, with its state arsenal, is one of the few cities in Illinois outside of Chicago which has an adequate structure. The others must put up with unsightly or poorly arranged buildings, inadequate as to size in most instances and this lack of facilities is always a handicap to the industry.

It has been suggested that in cities which suffer for the lack of public building for community purposes, the automotive dealers might lead a movement for the construction, taking care of the interior arrangement so that in addition to proper arrangement for all public meetings that it would also answer for a show of motor cars and accessories. These community buildings have been put over in a number of the smaller cities of the state and a similar movement in the larger centers might have equal success. Usually the rental fees pays the interest on the investment and the public welcomes the improvement, while the automotive dealers secure a desirable place to exhibit their cars.

PREMIER SALE POSTPONED

INDIANAPOLIS, Jan. 6—Judge Hay of the Superior Court of this city again postponed the court sale of the Premier Motor Corp. to Jan. 19. A plan of the reorganization committee of Premier Motors would merge assets of Premier and Monroe motor car companies, and a letter to creditors of the Premier concern has gone out this week making tentative announcement of such a move. It is understood that the court's action in further delay for the proposed sale was to give the reorganization committee time to work out plans and to raise funds to take over Premier on this basis.

REPUBLIC TIRES ADVANCED

YOUNGSTOWN, O., Jan. 7—Republic Rubber Corp. has advanced pneumatic tire and tube prices 12½ per cent.

Cole Plans Double Output With New Capitalization

Stock Increased From \$1,000,000 to \$2,000,000—Cars Not to Be Changed Materially

INDIANAPOLIS, Jan. 6—To provide for the doubling of its present production capacity, the Cole Motor Car Co. of this city has increased its capital stock

from \$1,000,000 to \$2,000,000 and has filed notice of this with the secretary of state of Indiana. The increased capitalization is practically covered by the company's cash surplus. The concern has an authorized capitalization of \$5,000,000.

In making the announcement, President J. J. Cole said that the new production program will be announced Jan. 7. It is said that no changes in any of the eight standard models or the two specials, except for the additions of refinements, will be made.

The Cole is the third Indianapolis car producer to increase its capital stock in recent times and to announce plans for increased production for 1923. The Stutz increased its capital stock some time ago, as did the H. C. S., though details of the expansion plans of these concerns are not yet released.

Another Indiana automotive manufacturing concern to announce increase of its capital stock is the Warner Gear Co. of Muncie, which announces a capital increase of \$500,000—from \$1,500,000 to \$2,000,000.

Rumors of a new start for the Premier Motor Corp. now in the hands of a receiver and up for court sale, are current, and the name of a nationally prominent manufacturer who is said to be one of the bidders for the plant is heard, though no confirmation of this can be obtained. Utmost confidence is expressed by those connected with the affairs of the concern that the deal will go through and that Indianapolis will have another active producer for 1923. It is intimated that the court's readiness to hold up the sale first announced for November is based on the financial responsibility of the rumored bidder and his known ability to put the thing over once the details of the deal are completed.

D. C. BARNETT RESIGNS

INDIANAPOLIS, Jan. 6—D. C. Barnett, secretary of the Indiana Automotive Trade Association, has resigned to enter district work for the Chevrolet Motor Car Co. It is understood that his territory will be northern Indiana, Ohio and southern Michigan.



J. J. Cole

Cadillac Opens 13th Annual Technical and Repair School

Dealers' Mechanics Will Be Invited to Attend Two-Weeks Course, in Classes of 12 at a Time

DETROIT, Jan. 6—The thirteenth annual technical and repair school has been opened by the Cadillac Motor Car Co. of Detroit. This school is held each year to instruct Cadillac mechanics in all sections of the country how properly to repair and adjust Cadillac cars.

The school is operated throughout the winter in sessions of two weeks each. Classes are limited to 12 mechanics and at the end of each session the pupils are given an examination by the instructor, and distributors and dealers, sending their men to this school at the factory, are notified as to the marks they received and the attendance record of the various sessions.

Applications to attend are made direct to the factory by the distributors and dealers and these are listed in the order they are received. The dealers are notified when their employes may attend this school and the necessary reservations are made.

The men in class sessions of 12 each are required to dismantle and reassemble a Type 61 car, under the guidance of the instructor. Extra parts, such as a rear axle, carburetor, generator, battery and transmission are also provided for the men to work on.

Earl Making Steady Gains in Production, Says Scobie

DETROIT, Jan. 6—George C. Scobie, president of Earl Motors, Inc., reports the factory making steady gains in production and expects operations to be on a basis of 1500 monthly by April. Manufacturing will not be pushed until after the New York and Chicago shows, he said, but in the meanwhile the factory force will be built up in preparation for heavy business later.

W. E. Stalnaker, sales manager, reports orders to be coming in satisfactory volume and that the company is encouraged over future business. New dealers are being acquired by the company, he said, and distributing contracts have been signed in important centers, notably Boston and Los Angeles. The company's exhibit at the national shows are the finest it has ever shown, he declared.

URGES GASOLINE TAX

INDIANAPOLIS, Jan. 6—Proposing a gasoline tax to be levied, and increased motor vehicle license fees to be devoted to maintenance of state highways and for the purpose of meeting Federal aid, Gov. Warren T. McCray of Indiana, in his message to the state legislature advanced the theory that such action "would relieve the necessity for a general

direct tax levy for highway purposes and would place the responsibility of raising funds for the upbuilding and upkeep of our highway system where it rightfully belongs."

Green Salesman Wins in Dull Season Contest

HARTFORD, Conn., Jan. 6—Four months ago, in order to stimulate sales through the dull season of the year, the L. & H. Motor Co., distributor of the Hupmobile, instituted a sales competition with \$100 as the first prize and \$50 the second prize.

Arthur Pinnell, who joined the sales force about the time the contest started and who never had previous sales experience, made way with the capital prize. Arthur Peterson won second place and was separated from Pinnell by but a few dollars. Pinnell was formerly a sergeant in the state police department. Sales Manager Allen, of the L. & H. Motor Co., was very much pleased with the sales contest.

TAKES OVER PACKARD BRANCH

ST. LOUIS, Jan. 6—George M. Berry, well known in motor car circles, having been identified with the manufacturing end of the business since 1902, has formed a corporation known as the Berry Motor Car Co., which has taken over the business of the Packard Motor Car Co. of Missouri, formerly conducted as a direct factory branch of the Packard Motor Co. of Detroit. Associated with Berry in the enterprise are Edward S. Maddock of New York and a number of prominent St. Louisans, among them S. C. McCluney, Eugene H. Angert and James L. Ford, Jr.

SYRACUSE SHOW PROMISING

SYRACUSE, N. Y., Jan. 6—Indications are that the fifteenth annual automobile show of the Syracuse Automobile Dealers' Assn. Feb. 26 to Mar. 3 will be the biggest in history. This year the officers of the organization have made arrangements for more space, for a large number of exhibitors could not be accommodated with all the room they needed last year.

C. H. Hayes, newly elected secretary of the dealers' association, is in charge of the show. A general advertising campaign, using every popular medium, has been inaugurated for the Syracuse show.

ALABAMA DEALERS MEET

BIRMINGHAM, Ala., Jan. 6—The Birmingham automobile dealers are all making plans to attend the annual meeting of the Alabama Automobile Dealers' Association to be held in Montgomery, Jan. 8, 1923.

Officers for the coming year will be elected at this meeting and a legislative committee will be named to look after the interests of the automobile dealers of Alabama at the session of the legislature which convenes this month.

Chandler Dealer Wins \$1750 For Best 1922 Sales Work

Award Made at Convention at Cleveland Attended by 750 Dealers and Distributors

CLEVELAND, Jan. 6—Chandler dealers and distributors numbering 750, who are here for the annual convention of the Chandler Motor Car Co., saw E. J. Bolz, of Los Angeles, awarded the first prize of \$1,750 cash for sales work in the last year. Twenty-three other prizes aggregating \$10,000 in values were awarded to prize salesmen of the past year.

The three day convention opened here with what officials pronounced unprecedented attendance and enthusiasm. George M. Graham, vice-president in charge of sales, service and advertising, told the dealers that notwithstanding 1922 had been a banner year, 1923 would be even better.

The sales convention was held in the Hotel Hollenden with Graham presiding. He outlined sales methods for the new year and gave the dealers a word picture of the 1923 line. Harry Walker, chief engineer, talked on the new job and Ralph Mulford on the performance of the new car.

At the conclusion of the three day convention here, the entire party will journey to New York to visit the automobile show and to make their own comparisons with every other make of cars made. They will also be in attendance at the Chandler exhibit.

Booth and White to Bring Out New Car Soon, Report

DETROIT, Jan. 6—D. McCall White, formerly of LaFayette and Cadillac and at present conducting a consulting engineering office in this city, will shortly bring out an entirely new car. The name of James Scripps Booth, known in the industry as an engineer and an authority on body design, is linked with the project. Details of construction and specifications are closely guarded by the company organized to manufacture the car, but it is known that the car will represent an effort to put on the market a product of exceptionally low weight of the highest quality at moderate price. It is stated the engine will be an entirely new type of silent, high efficiency type covered by patents held by D. McCall White. Strong financial support by Detroit capitalists is claimed for the organization.

AUSTRIA ABOUT TO QUIT

WASHINGTON, Jan. 5—High prices for passenger cars and trucks, necessitated by high labor cost, have caused the Austrian automobile industry to almost cease operations. Trade Commissioner Allport at Vienna, has cabled the automotive division of the Department of Commerce.

BUSINESS NOTES

A petition in bankruptcy has been filed against the Porter Spark Plug Co., 4358 Cottage Grove avenue, Chicago. Liabilities were listed at \$5000 and assets at \$2000.

Cole Motor Car Co. has declared a 100 per cent stock dividend on the 10,000 shares of capital stock of \$100 par, thereby increasing the company's capitalization to 20,000 shares. The dividend is payable to stock of record of Dec. 15.

Standard Auto Remodeling Co., 808 West Jackson boulevard, Chicago, has filed a petition in bankruptcy, listing liabilities at \$6,433.19 and assets at \$476.60.

The Welever Piston Ring Co., Toledo, O., has purchased a large building on Speilbauk avenue which will quadruple its space. The company has worked out a clever merchandising idea in connection with the manufacture and sale of piston rings and other reconditioning equipment and the front of the building offers a splendid opportunity for display. The company will have a model grinding shop operating in a show window which will adjoin a storeroom in which it will stock both its own piston rings and standard pistons, valves, piston pins and all parts that are required in the reconditioning of a motor.

The Front Drive Motor Co. announces the consolidation and removal of its offices and factory to 2131-33 Washington street, Kansas City, Mo., and the installation of new machinery and additional equipment.

The name of the Double Fabric Tire Co., Auburn, Md., has been changed to the Auburn Rubber Co. This change in no way affects the financial standing or policies of the company, or changes its ownership in any way. It is made to avoid confusing Auburn tires with other tires with somewhat similar titles.

EUROPEANS SEEK AGENCIES

WASHINGTON, Jan. 6—Numerous inquiries received by the automotive division of the Bureau of Foreign and Domestic Commerce from European countries indicate an increasing number of buyers and seekers of agencies for automobiles, tires and accessories manufactured in the United States.

During the week the division has had requests from seven firms in six European countries and one from Mexico. Under the practices of the department, the name of the firm making the inquiry is not given for publication but can be secured from the Department of Commerce on individual request.

TO MAKE A BOULEVARD

LOUISVILLE, Ky., Jan. 6—The plan of the Louisville Automobile Dealers' Assn. for converting Third street, from Kentucky street to the Confederate monument, into a modern boulevard, is said to have the favor of numerous property owners along that thoroughfare. The plan of the dealers is for erection of a monument to the heroes of the World War at Kentucky street. The association has pledged \$1000 toward this monument. The proposal provides for the widening of the street by converting the grass plots into pavement as a part of the boulevard. This would widen the street 28 ft., making a 70-ft. street with sidewalks of 15 ft. on either side.

OFF TO THE SHOW

CHICAGO, Jan. 6—About 35 members of the Chicago Automobile Trade Association departed today in two special Pullmans to attend the New York National Automobile Show.

Among them were the following: W. E. Butler, Franklin-Butler Co.; H. M.

Allison, Allison-Rood Co.; R. C. Crist, Edwards & Crist Co.; L. J. Brooking, Oakland Motor Car Co.; James Levy, James Levy Motors Co.; Dayton Keith, Wills St. Claire Co. of Ill.; H. C. Hower, Falls Tire Co.; W. C. Auble, W. C. Auble Motor Co.; Henry Paulman, H. Paulman & Co.; H. E. Cooley, Rowe, Young & Cooley; W. E. Swanson, Chicago Coach & Carriage Co.; Ray F. Mudd, Ray F. Mudd Motor Co.; G. C. Baker, Illinois Motor Sales Corp.; C. E. Gambill, Marmon Chicago Co.; C. P. Warner, Greer College of Motoring; Eugene Silver, Cole Motor Co.; John M. Isbell, John M. Isbell Co.; Arthur Jones, Arthur Jones Electric Co.; Edwin Bluthard and O. G. Hoffinger, Chicago Motor Car Co.; L. B. Sutherland, Cadillac Motor Car Co.; J. Murray Page, Locomobile Co. of America; John Quinlan, Quinlan Motors Co.; M. J. Sommers and John H. K. Raymond, Packard Motor Car Co.; Elmer Rich, Simons Mfg. Co.; W. L. O'Neill, Stromberg Motor Devices Co.; W. J. Zucker, Stewart-Warner Speedometer Corp.

Favors Control of Motor Transportation By the State

RALEIGH, N. C., Jan. 6—The North Carolina Corporation Commission in its biennial report to the legislature which meets this week recommends the state regulation of motor vehicle transportation. It is held that motor transportation for hire is a public utility, and as such should be regulated along with other public vehicles "so that travelers and shippers by such means can be made sure of safe, prompt, regular, adequate, efficient and economical service." In cases where motor vehicle transportation comes into or is likely to come into ruinous competition with other common carriers, it is held that the State ought to have the authority to come in and determine whether public necessity requires such competition, and save, if desirable, the pre-existing agencies of transportation.

It is also held that motor vehicle common carriers should carry some of obligations, financial and otherwise, in return for the rights given to operate for a profit over state-owned highways. It is also asserted that state regulation is needed to "for the purpose of eliminating the irresponsible, so-called fly-by-night companies and individuals, who, while undergoing certain destruction for themselves, pull down with the ruin well managed motor transportation agencies which render a real public service, and are entitled to a reasonable return on their investment and stabilization of their business."

COLUMBUS SHOW, FEB. 15-21

COLUMBUS, O., Jan. 6—The annual automobile show given by the Columbus Automobile Show Co., will be held at Memorial Hall Feb. 15 to 21, inclusive. Anson Coates will be manager of the show, as he has been in the past four years. The first three days will be given over to open types of cars and during Sunday the change will be made to enclosed types of cars. This will permit each dealer to exhibit a number of models of each type.

Best December Business in History Reported by A. E. A.

Jobbers, Dealers Profit by "Ask 'Em to Buy" and "Shop Profits" Campaigns

CHICAGO, Jan. 5—The best December business in history is reported by many retailers of automobile accessories and equipment, through jobber members of the Automotive Equipment Association, who have co-operated in promoting the merchandising activities initiated by the merchandising committee of the A. E. A.

These activities include the "Ask 'Em to Buy" and "Shop Profits" movements continuing throughout the year, the Christmas automotive gift campaign and the "One Dealer, One Salesman, One Million," campaign recently started.

The automotive Christmas gift campaign is credited with having done much to make the December sales the best in history for many dealers. Many manufacturers and jobbers entered into this campaign and co-operated intensively with dealers. In an effort to ascertain the extent of this business, Ray W. Sherman, merchandising director of the A. E. A., has addressed a questionnaire to members of the association. Out of the first ten replies, all but three were emphatic in asserting that the campaign had resulted in a great increase in business. Some stated that their replies were based on inquiries among their dealer customers and others based their replies on the volume of their own sales. All were of the opinion that the automotive Christmas gift campaign should be renewed this year and pushed with even greater intensity.

Director Sherman returned just before Christmas from a tour of the Southeast in the interest of "Ask 'Em to Buy" and "Shop Profits." He addressed meetings of dealers in about a dozen cities. Other meetings are to be held this month in West Virginia by E. C. O'Donnell and in Alabama and Louisiana by B. M. Ruark. Sherman will make an address in New York City on Jan. 10; Buffalo, Jan. 16; Cleveland, Jan. 24; Erie, Pa., Jan. 25; Winnipeg, Feb. 8; Sioux Falls, S. Dak., Feb. 15, and on Feb. 19 will depart for Oklahoma for a series of meetings.

In the One Dealer, One Salesman, One Million campaign, approximately 160 dealers have agreed to co-operate with a particular jobber's salesman in an effort to increase retail sales as much as possible. The results of this campaign thus far have been very satisfactory, Sherman said.

TO SELL SCHOOL CARS

CHICAGO, Jan. 5—The Chicago Board of Education has voted to accept bids of \$14,868 for 49 used cars which were purchased for approximately \$75,000 for use of employees of the board. A number of Fords were included in the lot, bids for these ranging from \$25 to \$100.

IN THE RETAIL FIELD

Agency for the Durant and Star cars has been taken over by the Lenoir Motor Co., Lenoir, N. C., organized as a partnership by D. A. Smith, H. F. Crump, L. E. Rabb and J. H. Beard.

B. D. Heath Motor Co., Inc., has been chartered at Charlotte, N. C., for general automobile business. B. D. Heath, F. T. Heath and Ruth Shelton Heath are the incorporators.

White Motor Truck Co. has been chartered at Charleston, S. C. J. E. Condon is president and treasurer, J. P. Condon vice-president and secretary.

Charter has been granted to the Greshaw Auto Company of Pelzer, S. C. A. W. Greshaw is president and treasurer of the concern. W. K. Hudgens is the vice-president.

Motor Company of Asheville, N. C., has been incorporated with an authorized capital stock of \$75,000 by J. H. Caine and others. A general automobile business is the object of the incorporation.

Kirkman and Cobb, Inc., Greensboro, N. C., have been chartered to conduct a general automobile business and operate a garage.

The Hawkins Motor Co., formed to distribute the Anderson car in St. Louis and territory, held the formal opening of its showrooms at 3870 Washington boulevard, Jan. 2.

P-W Motors, Inc., 1517 Connecticut avenue, Washington, D. C., has been appointed distributor of Packard motor cars in the District of Columbia and counties adjacent thereto in Maryland and Virginia.

The Hudson Motor Co. of Illinois, Hudson and Essex dealers in Chicago, has moved into its new building at 2220 South Michigan avenue. A formal opening, very largely attended, was held Jan. 2. The new building is one of the most modern sales and service establishments in Chicago.

Many visitors are being attracted this month to the salesroom of H. Paulman & Co., Pierce-Arrow distributor in Chicago, by an exhibition of beautiful paintings loaned for the occasion by an art gallery. The paintings were hung around the walls of the salesroom which was tastefully decorated. Henry Paulman, head of the Company, said the results of this undertaking were very gratifying.

Reo Motor Car Co. of Chicago has purchased ground 85 by 125 feet at Broadway and Early avenue upon which to erect a sales and service station to cost approximately \$100,000.

Sam B. Lambert and C. E. Graves, well known in the automobile sales field in St. Louis, who recently formed the Lambert-Graves Motor Co., Inc., have been appointed authorized Ford-Lincoln dealers in St. Louis. Lambert is president of the new company and Graves is secretary and treasurer. The firm is having a new one-story building erected at Kingshighway and Manchester for their sales and service departments.

The Kellerman Motor Car Co., with Arthur Kellerman as the head, has opened sales and service premises as a Maxwell and Chalmers dealer at 3318-20 Washington Blvd., St. Louis, under a franchise from the Ward Motor Co., distributors.

The Gilliam-Epstein Chevrolet Co., a corporation recently organized to retail Chevrolet cars, has opened showrooms at 5929-31 Easton Ave., St. Louis. L. T. Gilliam and Moke Epstein, organizers of the company, were formerly connected with the Clark Motor Co., Ford dealers.

The Wellston Motor Co., recently appointed authorized Ford and Lincoln dealer, has opened sales and service quarters in the one-story building at 6351-53 Easton Ave., St. Louis. Willis Broadhead is president of the new company and J. H. Farish is secretary. Broadhead was formerly connected with the Broadhead Motor Co., Ford dealer in East St. Louis, and Farish is president of the J. E. Farish Real Estate Co.

A new automobile accessory firm known as the McKnight-Jones Co., has opened headquarters at 2700 Locust Street, St. Louis. Loyal E. Jones and O. F. McKnight are organizers of the new company.

Aaron G. Cohen, Inc., Hartford, Conn., has been appointed associate Hupmobile dealer working under the L. & H. Motor Co.

The Britton Co., Hartford, Conn., distributor of the Stearns-Knight, is to retire from business. Charles O. Britton, president and founder of the company, died last summer. The concern is one of the oldest, beginning business with the two-cylinder Maxwell roadster.

Louis R. Spencer, Hartford, Conn., one of the founders of the Cylinder & Piston Co., has severed his connections with that concern and joined the Reid Motor Co., 278 Main street,

Hartford, Conn., as supervisor of service. The Reid Motor Co. has installed cylinder grinding equipment and is going after service work on an extensive basis.

Charles Helm, Hartford, Conn., secretary of the Britton Co., has taken on the Morand cushion wheels for trucks, various makes of rims, Firestone solid tires, as well as pneumatic tires for trucks, and opened a place at 1293 Broad street.

The Universal Auto Co., Hartford, Conn., which does a big accessory business, has added radio equipment and has a complete receiving set in operation.

A sales convention of the Connecticut Auto Sales Co., state distributors of the Durant and Star, was held at the Hotel Bond, Hartford, last week. Addresses were delivered by factory representatives. Orders were booked by the sub-dealers during the meeting on the Star car alone totaling \$50,000. The Hartford branch has already booked orders for 120 Star cars and has made a few deliveries.

The Childs Motor Co. has been appointed to sell the Davis and Earl in Northampton, Mass.

The Girard Motor Co., Northampton, Mass., has taken the agency for the Rickenbacker.

At a Christmas party of the Williams Motor Sales Co., Dodge distributor, Springfield, Mass., H. Raymond Augur, general manager, was given a gold watch by the company. The sales and service departments gave a bronze desk lamp for use in the office.

George T. Collins, former service manager of Brown, Thomson & Co., Hartford, Conn., Cadillac distributor, is erecting a new service station on Maple avenue to be devoted to Cadillac and Delco service.

F. W. Williams, Paige and Jewett distributor, Hartford, Conn., has removed from 185 Ann street to 376 Main street into a new sales and service building where he has over three times the floor space of the old location.

Russell P. Taber, Inc., Hartford, Conn., distributors of the Reo and Peerless, have kept the sales department on its toes throughout the season with the result that nearly 1200 new and used passenger cars and trucks were sold during the calendar year of 1922.

The Roy E. Warner Co., Louisville, Ky., has changed its name to Summers-Herrmann. Turner A. Summers, president, and Louis J. Herrmann, secretary and treasurer, have managed the firm for the past two years. Summers-Herrmann will continue to handle Fords and expect to occupy a new garage and sales room at the southeast corner of Third and Breckenridge by Aug. 1.

Edward Howe, formerly connected with the Standard Motor Co., Mobile, has become head of the used car department of the Leonhardt-C, a Willys-Overland dealer at Toledo.

Herbert Elliot Cutler Co. has taken over the Chandler and Cleveland agency for Salt Lake City, Utah. They are located at 247 East 2nd So. street.

Willys-Overland, Inc., has announced the appointment of the Jackman-Perkins Co., Dorr street and Detroit avenue, as a new Toledo dealer.

Leonard Smart, Moweaqua, Ill., has sold his garage to Claude E. Vollmer.

J. B. Peterson and Edwin H. Adams have sold the North Side garage, Geneseo, Ill., to Pearl Brown.

H. W. Misson, Inc., 4030-4040 Chestnut street, successor to the King Motor Sales Co., Philadelphia, has been appointed distributor of Gardner cars for eastern Pennsylvania, southern New Jersey and Delaware. The showroom and service station are being remodeled, affording the new concern twice as much space as had their predecessors. The officers are H. W. Misson, president; Walter S. Wheeler, vice-president; G. A. Kral, treasurer; H. William Misson, Jr., secretary, and William Lininger, salesmanager.

A. E. Malthy, for years an active member of the Philadelphia automobile trade, and whose most recent position in Philadelphia was that of general manager and vice-president of the Guy A. Willey Motor Co., has re-engaged in the automobile business in Los Angeles, after a rest of several months. Malthy is part owner and vice-president of the Lamberth Motor Co., Inc., 2901-2915 Whittier boulevard, Los Angeles.

The Oakland Motor Car Co. has established a salesroom for its Michigan retail branch in one of the buildings at the plant at Pontiac, Mich. Administration of the branch is handled from the plant, with G. W. Alger in charge.

The Reo-Cornelius-Spalding Co., distributor for the Reo in Louisville, Ky., has changed its name to the Reo-Spalding-Kelley Co. William Spalding

has been elected president of the concern while John S. Kelley is the vice-president and general manager in charge of sales.

The Jackson Park Buick Co., Chicago, has moved from 6842 Stony Island avenue to Sixty-seventh street and Dorchester avenue.

Charles W. Thurn and William Thurn, operating the Pana Motor Car Company, Pana, Ill., have filed voluntary petition in bankruptcy. They listed liabilities of \$19,000 and assets of \$5,000.

The Service Motor Co., 1612 Third avenue, Rock Island, Ill., has been incorporated with \$25,000 capital to deal in automobiles and accessories. The incorporators are Julius Gottlieb, Edward Hammerlisk and Mary M. Hein.

The Franklin Motor Sales, recently organized in Quincy, Ill., will be connected with the M. K. Weems Motor Co., Eleventh and Main streets. Roy F. Leiferman is head of the Franklin service department.

The Tracy Motor Corporation, Geneseo, Ill., has purchased the A. W. Weimer garage and taken over that business.

The Lyman Motor Co., Columbus, O., has started the erection of a salesroom and service station at 671-673 North Fourth street, Columbus, O., opposite its present location. The company distributes the traffic and signal trucks.

W. W. Russell, formerly manager of the Hamey-Eich Co., has organized the Russell Motor Car Co., to distribute the Dort in central Ohio. The salesroom and service stations are at 200 East Gay street, Columbus.

Horst & Wilkinson Auto Supply Co., Davenport, Iowa, will occupy a \$14,000 two-story brick business building being erected for it at 413-415 West Third street.

William Mariman and Elmer Mariman have taken over management of the Reliable Auto and Rubber Co., Burlington, Iowa, and reorganized it under the firm name of the Mariman-Overland Co. It will continue to distribute the Willys-Knight and Overland cars in this territory.

M. R. Miller, assistant branch manager for the Moline Plow Co., has purchased the interest of Frank Norris in the Blazer-Norris garage, Tipton, Ia., and will be active in management of the station.

Millar Tire and Supply Co., Cherry and Ferris streets, Galesburg, Ill., held "open house" Dec. 23 to celebrate occupancy of the remodeled and thoroughly equipped plant. Souvenirs were distributed to hundreds of visitors.

Geo. Keller is erecting a \$30,000 garage and auto salesroom for William Freede & Son, Chevrolet distributor at Decatur, Ill., which will be one story high, will cover a ground area of 100 by 152 ft. at North Franklin street in the 100 block.

The Nash LaFayette Co., Hartford, Conn., has leased for a term of five years the sales and service building now occupied by the GMC truck headquarters at 275 Connecticut boulevard.

The Colonial Automobile Co., Hartford, Conn., has removed from 1279 Main street and now occupies a new sales and service building on the Connecticut boulevard.

VIRGINIA ASSOCIATION TO MEET

RICHMOND, Va., Jan. 8—The annual meeting of the Virginia Good Roads Association will be held at Roanoke Jan. 29 to 31, according to announcement by V. D. L. Robinson, executive secretary of the association.

About 500 members of the association are expected to attend the meeting. Among other business to be transacted will be the naming of a committee to appear before legislative committees of the Legislature which meets Feb. 28, to urge the issuance of bonds for road construction. The association favors bonds for construction with a gasoline tax to provide the interest and sinking fund.

VOGUE CREDITORS MEET

TOLEDO, Jan. 6—A meeting of creditors of the Vogue Motor Co. will be held at Tiffin, Jan. 15. At this time, Referee Fordyce Belford may appoint a trustee in bankruptcy. The schedule filed in Federal court here shows liabilities of \$62,581 and assets of \$35,915.

CONCERNING MEN YOU KNOW

H. H. Day, New England district representative for Dodge Brothers, was presented with a box containing \$1000 in gold, and some other gifts for his home, by the dealers who handle that car in the New England territory, as a reminder of how much they think of him. The presentations were handed to him at a dinner just before Christmas, celebrating the eighth anniversary of his appointment.

J. F. Wildgen, former superintendent of the Chevrolet plant in St. Louis, has been promoted by the Chevrolet Motor Co. to the position of manager of production left vacant by the resignation of J. H. Hunt who resigned to join the Durant organization and take charge of the Hayes-Hunt Corporation recently incorporated at Dover, Del.

F. C. McDonald, president of the Southwest Nash Co., was elected a director of the St. Louis Automobile Dealers' Association at a meeting of the Board of Directors Dec. 26. McDonald fills the vacancy that arose from the resignation recently of G. E. D. Donnelly.

A. H. D. Altree, vice-president of the American Bosch Magneto Corporation, Springfield, Mass., has sailed on a trip to England and Continental Europe, for the purpose of stimulating sales by the company's foreign branches and agencies.

James A. Bennett has been appointed Sales Manager of the Connecticut Telephone & Electric Company, Inc., to succeed C. E. Stahl.

Marvin E. Monk has been made director of sales for the U. S. Ball Bearing Manufacturing Co., Chicago, Ill., manufacturers and distributors of high-grade ball bearings. Monk has, for some time past, been assistant sales manager of this company.

Harold D. Bornstein, sales manager of the Cadillac Automobile Company of Boston, was tendered a farewell bachelor dinner by about 40 members of the organization just prior to his leaving for Nashville, Tenn., to wed Miss Stella Abrams of that city on Dec. 27. He was presented with substantial gifts.

Otis C. Friend, for many years president of the Mitchell Motor Car Co. at Racine, Wis., has become identified with the Lavine Gear Co., formerly of Racine, now located in Milwaukee. He will be directly in charge of passenger car sales and for the time being will operate out of the Milwaukee office.

R. B. King has joined the Transport Truck Co.'s sales organization and will divide his time between the general offices at Mt. Pleasant, Mich., and the distributing organization. He was formerly connected with Republic Truck Sales Corp. as sales promotion manager and eastern division sales manager.

HARTFORD SHOW, FEB. 17-24

HARTFORD, Conn., Jan. 6—The dates set for the annual motor car exhibition of the Hartford Automobile Dealers' Association are Feb. 17 to 24. The show will be held at the Broad street state armory. Arthur Fifoot, secretary of the dealers' association, is show manager and the show committee is composed of F. W. Williams, chairman; Dwight A. Burnham, treasurer and Earl C. Bowman. The show will be for passenger cars only. Accessories will be featured.

HUPP TO BUILD 40,000?

DETROIT, Jan. 6—Hupp Motor Car Co.'s new prices, as announced in Motor AGE last week, are based upon the company's anticipated increase in production in 1923 to 40,000 cars. Production in 1922 approximated 35,000, an excess of 5000 over the early year schedule.

NEW BELGIAN MANUFACTURER

WASHINGTON, Jan. 6—A new automobile manufacturing company has been incorporated in Belgium, to be known as the Excelsior Co., headquarters at Brussels. The company will build a light four cylinder car to sell for 24,000 francs.

Jay R. Emerson has resigned as purchasing agent of King Motor Car Co., a position he has held for nine years, and will become purchasing agent of Durant Motors at Muncie, Ind. His resignation with King is effective Jan. 12.

H. V. Welles, sales manager of the Detroit Gear & Machine Co. for the past six years, has resigned to become secretary and treasurer of a Detroit advertising agency.

Joseph H. McDuffee has resigned as assistant general manager of the Cole Motor Car Co., retiring on Jan. 1. As yet McDuffee has not announced his future plans. McDuffee long has been identified with the industry, first with the Stanley steamer, later as Stoddard-Dayton dealer in Chicago fifteen years ago, and after that with such prominent concerns as Stearns-Knight and Willys-Overland.

Howard D. Little, a member of the Willys-Overland sales organization in Toledo for eight years, has been appointed retail sales manager of Willys-Overland, Inc., Toledo, and will succeed W. O. Kiracofe, who joins the factory organization as special sales representative. The changes were effective Jan. 1.

Clarence F. Tollzien, for a long term of years a prominent member of the Packard Motor Car Co. organization of Detroit, has identified himself with the Spring Perch Co. of Stratford, Conn., manufacturers of automobile springs, as its exclusive representative for the states of Michigan and Ohio with offices in the General Motors building of Detroit.

C. C. Bowman, chief engineer of the Standard Motor Truck Co., Detroit, has been appointed vice-chairman of the Frames division of the Society of Automobile Engineers. Bowman has been serving on the frames division during the past year and has given considerable time and study to the frame problem.

E. D. Emmons, sales manager of the Hayes Mfg. Co., Detroit, has tendered his resignation to take effect Feb. 1 after a connection of 16 years with the Hayes organization. Emmons has not made definite plans for the future.

Frank Elmer Tiscornia, vice-president of the Auto Specialties Co., St. Joseph, Mich., died late in December at his home at Oakland, Cal.

Henry H. Holt has been made manager of the Brooklyn branch of Willys-Overland, Inc., taking up his duties the first of the year. Holt has been a member of the New York Overland sales department for the past three months and previous to that has been service manager of the New York branch. He has been with Overland branches in different cities for the past six years. He has been active in service association work, having been president of the New York association for the past year.

and is expected to compete successfully with several medium-priced American cars now on the Belgian market, according to a report from Acting Commercial Attaché S. H. Cross.

ENTRIES FOR CHICAGO SALON

CHICAGO, Jan. 6—Entries already received for the Chicago Automobile salon to be held at the Drake Hotel Jan. 27 to Feb. 3 include the following cars: Benz, Cadillac, Cunningham, Daniels, Duesenberg, Isotta Fraschini, Itala, LaFayette, Leon Rubay, Lincoln, Locomobile, Marmon, Minerva, Packard, Rolls Royce and Winton. Coach work exhibits for which entries have been made are those of Fleetwood, Kimball and de Causse.

FINANCE COMPANY ORGANIZED

WASHINGTON, Jan. 6—The sale of automobiles during the coming year is to be increased here by the formation of a \$1,000,000 finance corporation, to be known as the Automobile Finance Co., the stock of which will be largely subscribed by automobile concerns, whose affiliation with the organization, is predicted, will enable them to secure funds for the discounting of automobile paper.

John R. Lee Withdraws From C. H. Wills & Co. at Marysville

Resignation Marks Last of Original Staff of Company's Officers

DETROIT, Jan. 6—John R. Lee has voluntarily withdrawn from all interest in the C. H. Wills & Co., enterprises at Marysville, and for the present will not make any statement as to anticipated future activities. With his withdrawal practically the entire original staff of officers of the Marysville company, with the exception of C. H. Wills, have gone. The list includes Kirk B. Alexander and Charles Morgana, who with Lee were also vice-presidents in charge of departments.

Confirming the Lee withdrawal, Wills said: "In the process of reorganization work now going on Mr. Lee has voluntarily made the decision to withdraw from all of the C. H. Wills & Co. enterprises. Mr. Lee's decision to take this step has not changed in any way our relations toward each other, these being, let me say, most cordial and friendly.

Voluntary Withdrawing

Lee, who was with Wills at the time, added: "I am voluntarily withdrawing from the C. H. Wills & Co. interests, but my relations with Mr. Wills and my hopes for Marysville have in way changed. I will until the end of my life, be deeply interested in the welfare of Marysville and the success of the projects there. I believe in Marysville firmly, and I have the deepest faith in the outcome of what is being done there. I believe in Marysville's future and at all times I will do all that I can to aid in bringing the success the future holds for it."

Commenting further on the Lee resignation Wills said that it was not incidental to the receivership but was permanent and was to conform with the plan of reorganization of the company which is being worked out by banking interests. This he said would probably result in the conclusion of the receivership without sale of the company. No new officers will be named until the receivership is concluded.

In addition to the changes in the present line of cars, two new models have been added which will be shown for the first time at the New York and Chicago shows. The prices on the new models will conform with those of the present line. Work on the appraisal of the plant and property of the company is still in progress but will be concluded this week.

BIG BUICK SHIPMENTS

DETROIT, Jan. 5—More than 1200 cars were shipped or driven away from the Flint and Detroit plants of the Buick Motor Co. on Friday, Dec. 29. This beats the best previous day in the history of Buick, Oct. 28, when 1029 cars left the plant.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Relining Chevrolet Clutch

We have had a request from one of our readers that we republish a Clearing House article that appeared in the August 12, 1920, issue of MOTOR AGE. The article covered the procedure necessary in removing, relining and replacing the clutch on a model 490 Chevrolet.

The procedure is as follows: Remove the floor board and wire running from the battery to the starter. Remove the three bolts holding the V brace to the engine base and gear box support and remove the V brace. Disconnect the brake rods from pedals and remove the bolts holding clutch release shaft to gear box support and remove clutch release cross shaft, together with pedals. Remove the bolts on rear clutch hub drive ring. Remove the four bolts holding the gear box side arms. Care should be taken in removing the shims under the gear box, so that they may be replaced in the same position. Remove one bolt holding the left gear box side arm (on the pedal side) to engine. This permits gear box side arm to spring to one side when removing the gear box, lift gear box up and slide it forward. It may then be removed from the chassis.

Jack Beneath Propeller Shaft

A jack should be placed beneath the propeller shaft to hold it in place when the gear box has been removed, turn the flywheel until the hole passing through the clutch hub is at the top, and the clutch spring retaining pin is in line with the hole. The clutch spring will then have to be compressed and the pin will usually drop out when over the hole in the housing; if it does not drop out it may be driven out with a drift and hammer, next draw clutch spring out, remove bolts holding clutch hub to clutch spider and remove clutch hub.

This is necessary, as the hub would otherwise interfere when removing clutch; pull clutch out. Remove nuts holding flywheel to crankshaft flange and with a bar loosen flywheel and remove. It is advisable to mark the position of flywheel on flange so it may be replaced in the same relative position.

Remove Flywheel With Clutch

Remove flywheel together with clutch spring, anchor stud and place it on two boards nailed to a bench. Separate all parts and clean with gasoline and waste. It is best to obtain new clutch lining from the makers, but if this is not expedient the old lining should be carefully removed and used as a pattern for cutting the new lining. The new leather

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

should be much thicker than the old lining and of uniform thickness.

Tight Fit Important

The most essential point in fitting the new leather is to have it fit tight and true to the cone. If the clutch has been relined it will not work perfectly until it has been worked in. This usually takes some time and during that period it should receive frequent applications of neatsfoot oil. To fit in new leather, soak the leather in water, then secure one end of the leather to the cone by one copper rivet (rough side out). With only about $\frac{1}{4}$ of leather on the cone, pin the other end to the cone by a rivet, force the leather up onto the cone. It should fit evenly with uniform tension. Drill and countersink the rivet holes, rivet the leather in place, being certain that rivet heads are $\frac{3}{32}$ in. below the leather and well headed on the other side. Allow the leather to dry slowly, as otherwise it will shrink too much and expose the rivets.

The assembling process is as follows:

Lift flywheel back into place on the engine. Bolt it back in the same position as removed. Do not tighten any one bolt until all are drawn snug. This removes the possibility of having the flywheel out of true, which would ruin the thrust bearings. Force the clutch back into position. Bolt clutch hub to clutch spider. Draw all bolts up snug before any one is tightened. Put clutch spring back in place and pack with grease. Compress clutch spring and replace clutch spring retaining pin. Lift gear box back into frame. It will have to be sprung past the gear box side arm.

Replacing Bolts

Replace bolt holding gear box side arm to engine. Replace the bolts on rear clutch hub drive ring. Bring all up snug together. Replace bolts holding gear box to side arm. (Make certain that the shims are replaced exactly in the same position from which they were removed.) Replace clutch release shaft with clutch yoke and pedals. Connect brake rods. Replace V brace, connecting gear box support with engine. Refill the reservoir on clutch yoke and grease cups on clutch cross shaft. Oil all working parts. Replace wiring.

Start engine and note whether everything seems to be working properly. If there is a rattle in the clutch drive ring it will indicate that the gear box is out of line. The shims will have to be shifted or possibly removed. When perfect alignment is reached the rattle will cease.

FORD COIL TESTER

—We would like to have description of a Ford coil tester to be used with storage battery and also provided with means for testing spark plugs.—Claude James & Son, New Orleans, La.

We believe that it would pay you to buy one of the standard Ford coil testers rather than to spend a great deal of time making one. These can doubtless be seen at your jobbers. The construction of a device of this kind however, involves the use of a wooden box having spring contacts which will make connection with the Ford coil terminals when inserted in the box.

The battery connections go to the bottom terminal of the coil and to the top terminal at the side. Connections to spark gap, which can be adjustable if desired, come from the two side terminals and a pair of brackets in parallel with the spark gap can be used to test a spark plug, although the test does not mean very much unless the points are opened to about $\frac{3}{16}$ inch. On a test of this kind a Ford coil is usually set to draw from 1.25 to 1.5 amperes.

Service Station Needs Large Stock Room

Q.—We have recently purchased the lot adjoining our present building and are contemplating building in the near future.

We are attaching hereto rough sketch showing the size of the lot which is 52x200 ft. We are dealers in Ford and Lincoln cars. We sell 325 Ford cars per year, last year we sold 336. Of course, we have not sold any Lincolns and sell very few Fordsons here. Our parts business, Ford parts, runs about \$35,000 per year and our accessory sales run about \$30,000. We, therefore, need a large stockroom. We have a completely equipped shop and are able to do every kind of work on the Ford car.

Note on our sketch the street named Cole. This is the most prominent street and would be more desirable for a display room. We anticipate building two stories and prefer no entrance for driving in on Cole street, as a church stands directly across from our lot. Our entrance to the garage should be on Hudgins street. We are figuring on an elevator.—R. E. Matticks, Logan, W. Va.

Your letter does not state your intentions regarding the old building so we have left it out of the consideration and suggest that you use it for new car storage, second-hand showroom (fronting on Hudgins street) and overflow transient and regular storage.

We would advise moving the entire shop and equipment to the second floor where conditions are best. There should be reserved, however, a small section near the Hudgins street entrance for quick service, adjustments and possibly simple tire repairs.

We have placed the elevator in such a way that it serves as entrance to the showroom. This is a good feature since it uses space otherwise wasted in a passage way and gives at the same time an ideal approach to the elevator on both floors.

Parts Stock on Second Floor

The parts stock has been placed on the second floor because it works out best that way but primarily because it should be handy to the shop with a corresponding saving of mechanics' time. There is a neat little parts salesroom at the top of the stairway where retail sales can be made over the parts room counter. Near the service entrance is the logical location for the accessory store where persons waiting for service will naturally be attracted by the display. A good salesman here will work wonders in pushing novelties and tires. It would be an ideal place to try out the Ask-em-to-buy system.

The car salesroom would be entirely uncontaminated with other interests which is as it should be. Interruptions which break into the car salesman's talk are usually disastrous, consequently the fewer the other interests, such as accessories and parts, the prospect sees the more chance the salesman has.

Light on the first floor is the only problem but the office is the only department that will suffer. Artificial light will be satisfactory in the garage, but if the old building is not too high

Architectural Service

In giving architectural advice, MOTOR AGE claims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things,

we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

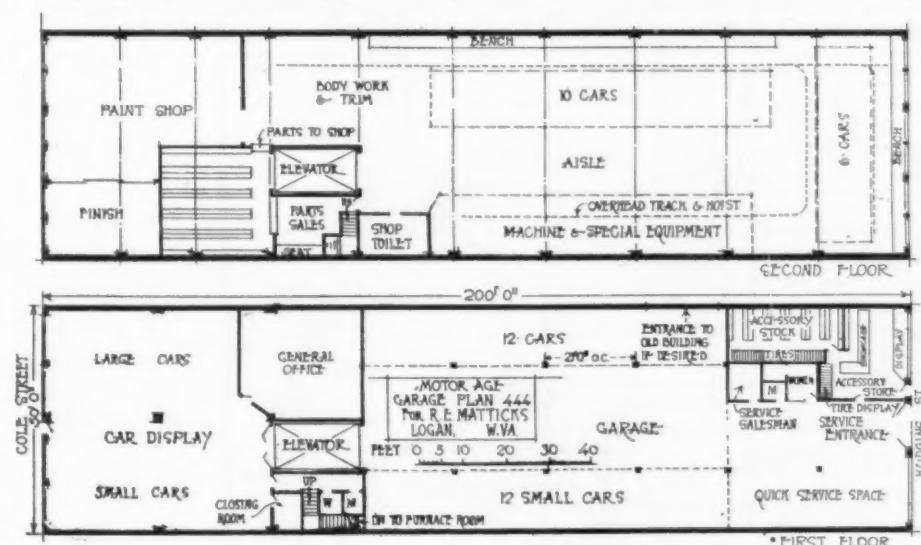
What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.



a row of high windows along the ceiling might be installed which would light the whole interior fairly well. If you control the property back of the old building on

Cole street, it would be a good plan to get some windows in the office.

Lighting of the second floor should be by liberal use of skylights.

A Test For Piston and Wrist Pin Knocks

Q.—What causes a 1915 model Dodge touring car to knock? The engine runs quietly when running idle, but when driving along on a level road at 10 m.p.h. and we start to speed, we notice quite a knock which seems to be only on one cylinder. If we short out the rear spark plug the knock will be gone. We recently installed a new center main bearing (lower half only) to take out the end play in the crankshaft. Now it knocks the same way only worse, and the knock disappears when we short the third plug. This condition has come on gradually in the last couple hundred miles of driving. The car has been driven about 500 miles since the bearings were taken up and they were in good snug condition when we installed the center main bearing. The camshaft bearings are tight, so that cannot be the cause of the trouble.—A Reader.

1—If the trouble disappears on shorting a plug it is usually an indication that the connecting rod bearing needs tightening. It is possible, however, that the trouble is in the piston being loose in the cylinder, due to wear, or the trouble may be in a loose wrist pin.

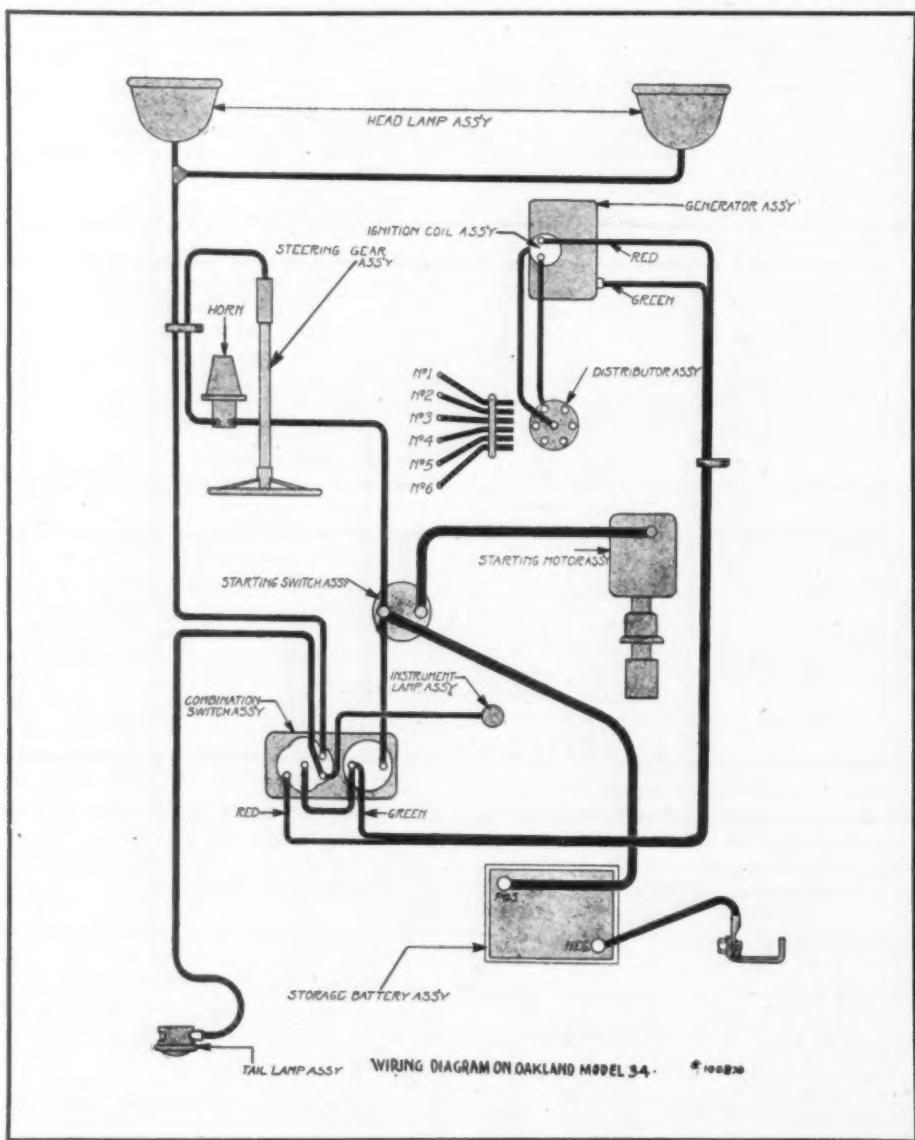
One test that you might make is to remove a spark plug say in the third or fourth cylinder which you suspect is causing the trouble and put in about a tablespoonful of 600 W. Then replace the spark plug and run the engine. The heavy 600 W. tends to act as a cushion

and prevent the piston and wrist pin from knocking. If this temporarily cures the trouble, it shows the piston or wrist pin to be at fault, but if the knocking still continues in that cylinder it indicates that the connecting rod bearing itself is loose on the crankshaft.

A possible cause of connecting rod bearings loosening up is in an eccentric crank pin and this can be checked with micrometers. It is also possible that the connecting rod is either twisted or bent and this should be checked up with an aligning gage. Another possibility is that the center main bearing cap which you installed for the purpose of locating the crankshaft and taking out end play has not been installed properly and holds the crankshaft out of place.

To check this, you can take off the bottom engine pan and look up into the engine while someone turns it over by hand. The connecting rod should not bear tightly against either piston boss at the wrist pin end but should play freely somewhere in between. Another test you might make would be to loosen the connecting rods one at a time and see if they tend to spring either forward or backward, which would show that the rod is bent or that the crankshaft is out of its proper position. We are also sending you by separate letter, a sheet which gives 20 possible causes of engine knock.

Reconditioned Cylinders Better Than Baffle Plates



Q—Would it be practicable to install baffle plates in a 1916 Oakland to stop oil pumping? This car needs the cylinder block reground and new pistons fitted but we cannot afford to do it now.

1—The labor cost of installing baffle plates is nearly as much as for regrounding and putting in new pistons. Furthermore, the baffle plates are not satisfactory, so that it is not advisable to waste the time and money trying to make a half way repair. The only thing to do is to wait until you can do the job right and get a satisfactory result.

2—Supply wiring diagram for Oakland model 32-1916, also for model 34B-1918 cars.

2—Diagrams are shown as requested.

3—Can the 1918 model 34B Oakland car be run with the generator disconnected from the battery? If generator must be grounded, advise which lead to ground.

3—We do not see any reason for your question, as it is practically out of the question to run a car equipped with battery ignition without a battery. Then, when you have a battery in the car there is no reason why the generator should be disconnected from the battery.

If something has gone wrong with the generator so that its armature is

shorted, for example, there is nothing to worry about, as the generator will not charge anyway and accordingly will not cut in and will not be connected to the battery. Assuming, however, that you

have some peculiar condition such as a battery removed and the ignition operated by dry cell, you would then have to lift the third brush or ground the main live brush. The diagram shown does not give the internal connection, so you might have to experiment grounding the brushes that are accessible to get the right one.

You could disconnect the battery lead from the cut-out and remove the cover from the cut-out. Then if you ground the proper brush and race the engine the cut-out points will not close. Should you fail, however, to kill the generator and then run the engine you will find that the cut-out contacts do close. This would be a sign that the generator is producing a voltage and will burn itself up if allowed to run this way.

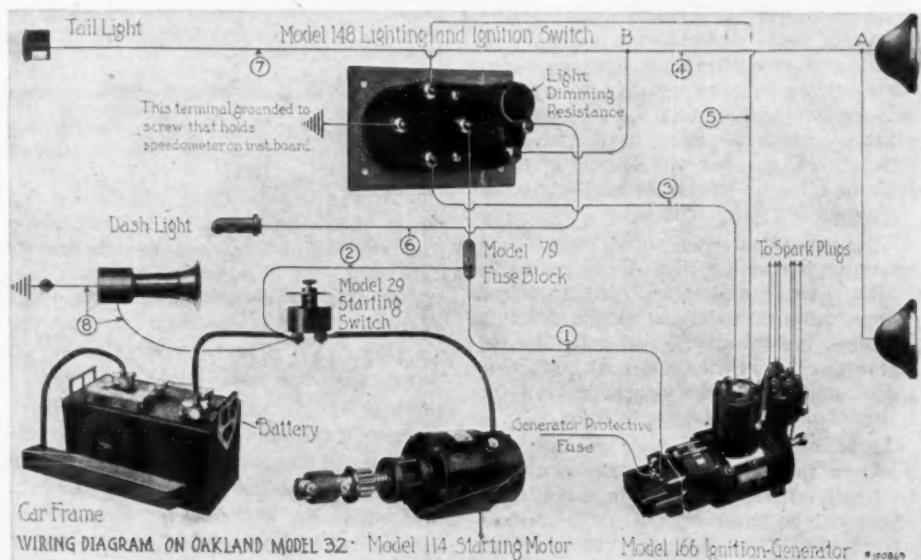
4—A regrounding shop in this locality regrounds 1918 Oakland cylinder blocks and installs light weight grey iron pistons instead of Lynite, which the Oakland company furnish. Do you think this would affect the running of the engine?

4—The running of the engine will be affected but slightly. The pickup will not be quite so good as with the lighter pistons and if the engine should be run for long period of time at very high speed the extra weight of the piston would have a tendency to increase the wear on the connecting rod bearings. We believe that for ordinary service, however, the cast iron pistons will be found satisfactory.

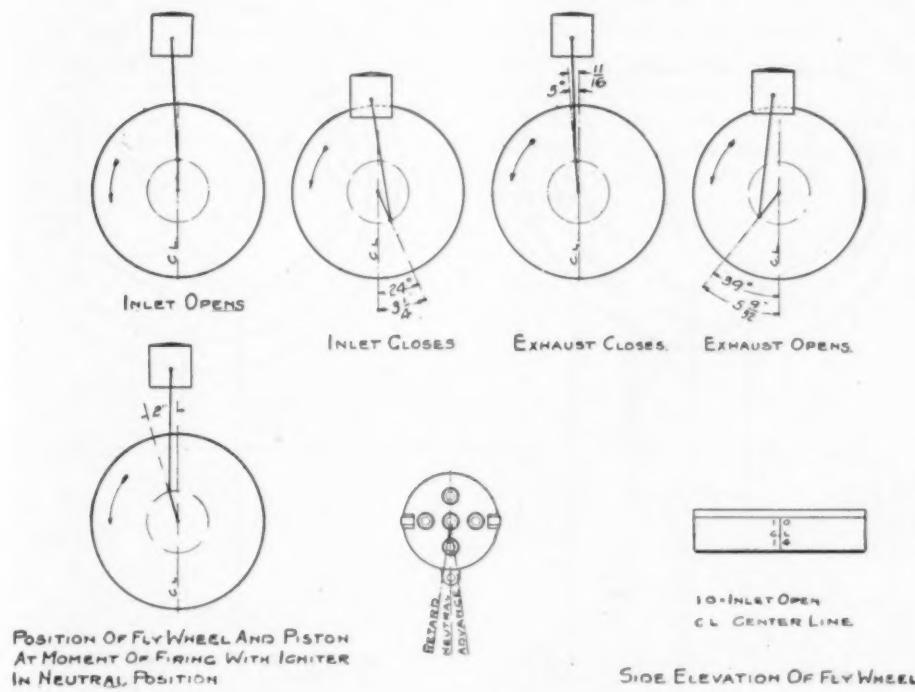
5—Can you give any simplified test or method, using a low priced ammeter or other instrument, to tell if the Ford magneto is supplying enough electrical energy for reliable starting and running? Could same method be used on a Fordson tractor?

5—We do not believe there is any device that can be purchased for a very low price, as \$10 or \$12 would probably be the price of an A. C. voltmeter for this purpose. If an A. C. voltmeter is used it should show a reading of 3 or 4 volts when the engine is being cranked fairly rapidly by hand. At high engine speed the voltage should be 26 or 30 volts, depending, of course, on the speed as the voltage comes up in direct pro-

(Continued on next page)



Valve Timing of 1917 Hupmobile



Q—Publish the valve timing diagram of a 1917 model N Hupmobile.—Rowley Horen, Toledo, O.

The timing of the Hupmobile model N engine is shown in the accompanying illustration. The inlet valve opens on

top dead center and closes 24 degs. or $3\frac{1}{4}$ in. past bottom dead center. The exhaust valve closes 5 degs. or $11\frac{1}{16}$ of an in., measured on the flywheel, past top dead center and opens 39 degs. or $5\frac{9}{32}$ of an in. before bottom center.

(Continued from preceding page)

portion. Some concerns making electrical testing equipment have put out devices for checking the condition of Ford magnetos. One such device uses an A.C. ammeter and a resistance, in other words, imitates a load on the magneto and measures that load.

6—Can you give instructions for adjusting headlights to comply with California state laws?

6—A copy of the California motor vehicle acts can be obtained by writing to the California State Printing Office, Sacramento, Cal. Laws of this kind usually require a certain apparent candlepower at various distances in front of the car and various heights above the road and to the right or left. The difficulty in checking up in accordance with these laws is that there is no simple device on the market for determining the candlepower as stated in the law. The only alternative is to have a well equipped illumination laboratory do the work and this, of course, is out of the question for the average garage or repair shop.

As far as headlight adjustment is concerned, there is not a great deal to it. The headlamps are usually adjusted with a crowbar or pinch bar as far as directing the rays up or down is concerned. Cars now, however, are being equipped with headlamps that are adjustable up and down and sideways, so

that the rays of light can be properly directed down the road.

About the only other adjustment that the repair shop can make is in the setting of the bulb forward or backward in the reflector so as to properly focus the filament. This means that the filament is located in a critical point in the reflector so that the light is cast most efficiently on the road ahead. Inasmuch as there seem to be no devices on the market for accurately checking up the light, about the only thing that can be done is to use lenses that have received the official approval of the state in which the car is used.

7—We have a 490 Chevrolet, either 1918 or 1919, and this car is driven by an old man who drives very slowly. The result is that the generator does not charge enough at these low speeds to keep the battery charged, and we would like to know if there is something we can do to the generator to make it charge more at low speeds.—John M. Thomas, Anaheim, Cal.

7—Chevrolet generators in 1918 were of two models. The first one had a shunt coil on each field pole, also a series field, and in this it would be somewhat difficult to increase the charging rate. The shunt winding, however, is made up of two coils, one on one pole and one on the other, and these two coils are in series and connected across the brushes. There is also a connecting lead running from the top coil to the bottom one. It would be possible to

connect these two coils independently across the brushes so that more field current would be drawn and the generator would charge more at low speed.

We are somewhat doubtful, however, as to the satisfaction that would be obtained, as the coil might overheat if this experiment were tried. If you wish to make the change, however, and the generator is of this type, you can cut this lead in two, which runs from one shunt coil down to the other, and connect the ends to the brushes. If you get it the wrong way the generator will not charge, so all you will have to do is reverse the connections at the brushes, these being the connections that you made by cutting the connecting lead in two.

If the generator, on the other hand, is of the third brush type the increase in output is comparatively easy. The field winding is connected from one main brush over to the third brush which is very near the grounding brush. To increase the charging rate you can disconnect the lead from the third brush and not use it at all, taking this field lead and grounding it or connecting it to the main brush, which is near the third brush. This should give more current at low speed but if the car is driven at high speed would give too much current.

Condensers and Contacts on the War Path

Q—We are having considerable trouble with grease leaking out on the service and emergency brakes on the rear wheels of a 1919 Mitchell model D-40 touring car. We have tried installing new felt washers but they only seem to hold for a very short time. There does not seem to be too much grease in the differential housing, as we only put in about four pounds.

Advise whether you would think it feasible to drill $\frac{3}{8}$ -in. diameter holes in the bottom of the axle housing just inside the outer roller bearings. We have used this method on Ford cars which we were unable to control by any other method, and have had no trouble with the bearings running dry.—Campbell Motor Company, Mammoth Springs, Arkansas.

We would advise against drilling the axle housing, first because of the fact that grit and road dirt can enter through these holes and, second, for the reason that these holes will not be necessary in order to keep down the grease leakage.

The Mitchell rear axle carries felt washers at the outer bearings to prevent grease getting onto the wheels and brake drums. The outer washers, however, are called on to hold back only that grease which gets past the inner grease retaining washers. These inner grease retaining washers are mounted at the inner end of the axle tube about 3 in. out from the differential carrier bearings on each side. The felt washers are held between steel retainers and in order to replace them it will be necessary to remove the differential carrier assembly. These parts are standard on the Mitchell rear axle and can be secured from any authorized Mitchell dealer.

Reconnecting 12 Volt Hand Warmers for Use On 6 Volts

Q—We have on hand several hand warmers to be attached on the steering wheel but they are to be used with a 12-volt system. How could these be changed to work on a 6-volt system?

1—An illustration is given showing a possible way in which the hand warmers can be changed over for use on 6 volts. If the hand warmers are connected as shown in the left figure in the illustration you can change the connections as shown in the right figure. However, if the 12-volt hand warmers are already connected, as shown in the right figure, there is nothing you can do to make them correct for six volts.

2—What kind of resistance wire is used on a 6-volt system to dim the headlights?—D. C. Slick, Mgr., the East Granite City Garage, Granite City, Ill.

2—German silver wire is normally used for this purpose. In an emergency it would be possible to use iron wire, but iron has the disadvantage of changing its resistance with the heat, whereas German silver wire maintains a definite value of resistance.

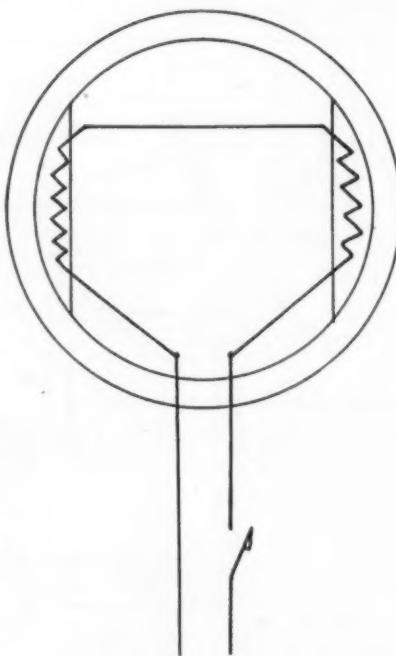
GROUNDED COILS MAKE RECHARGING USELESS

Q—We have been recharging Ford magnetos with great success, without removing them from the car, but recently we have been greatly perplexed with two Ford magnetos that have developed peculiar cases of trouble. Either one will take a charge readily and without any plausible reason will go dead. It may be within five minutes or three days, and after going dead they can be recharged again and will work for a while. Neither car has any electric battery, either dry cell or storage. Is it possible for a short circuit to demagnetize a magneto? Give all possible data in regard to the above condition.

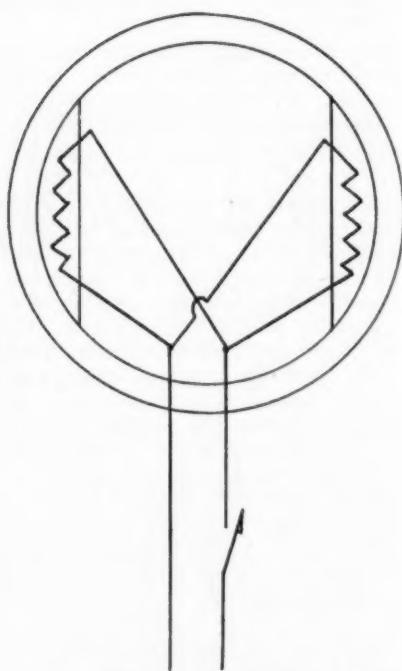
1—We are of the opinion that the cars in question have coils which are grounded. When you go to recharge the magneto you also burn the ground loose, but apparently the severance of the accidental ground in the coil is only temporary and as the car vibrates the coil again comes in contact with the pole piece or crankcase, or whatever portion it is that the coil bears against. Under these circumstances, would suggest that when the condition is encountered that you check the resistance of the coils with a battery.

This can be done by getting ready for the charging process and then, instead of using a 24-volt battery use a 6-volt battery and an ammeter. With the 6-volt battery the ammeter should show about 12 amperes, and if it shows greatly in excess of this value it shows that the magneto winding is grounded, as above suggested. The only remedy under these circumstances is to tear the engine down and either locate and replace the defective coil or put in a new set.

2—We have read articles in your magazine about personal contact in business. Just how far would you go with personal friendship for best business relations? It has been our experience that too personal friendship breeds poor pay, and outstand-



12 VOLT CONNECTION



6 VOLT CONNECTION

100871

ing bills make your best customers shun your place of business.—Mullen's Auto Electric, H. L. Mullen, Fresno, Calif.

2—In our estimation, the personal contact should go to the extent of knowing your customers by name, knowing something about their general interests and business activities, so that when you pass them on the street you can greet them by name and make an intelligent remark or one that will show your general interest in their welfare. We believe you are right, however, that if this is carried too far and you get too chummy with your business associates, that you may have the trouble you have indicated. We believe that it is possible, however, even with your business associates that are also rather friendly with you that you draw the line distinctly between your business and personal association.

For example, if a good friend asks you to do a job and asks you to wait until Saturday, just tell him that it is a matter of business principle with you and has nothing whatever to do with your personal relation. Furthermore, if you start extending credit to any one person that, as a matter of justice, you would have to do the same to others, as you have a great many friends in town. Then tell him that a multiplication of such items would run into a credit investment that you are not able to handle.

We appreciate that such a condition is not easy to handle, but the best way to handle it is to start the first time a question of the kind comes up. Be courteous but definite in the matter and you will eliminate further requests in that direction. You do not need to be afraid of losing a friend, as anyone who is really your friend will not wish you to start a practice which will be harmful to your business.

CAMSHAFT KNOCK

Q—We have a Buick, Model K-45, 1920, which has a knock which we believe to be in the camshaft at the rear bearing. We have tightened up all other bearings and the engine still has a knock. This car has been run 9,000 miles. Advise how to remove camshafts to put in new bearing at rear end if one is needed. The knock is regular when engine is running. Is there a chance for this trouble to be in the pumpshaft at the rear end?—Orville Maxey, Bluford, Ill.

1—It is quite likely that this trouble is due to camshaft bearings, but the only way to be sure is to pull out the camshaft and inspect and check the tightness of the shaft in its bearings. To take out the camshaft it is necessary to remove the radiator and the timing gear case at the front of the engine. It will also be necessary to remove the valve push rods. You will find it advisable to drop the oil pan, so that you can get underneath and inspect the camshaft and see just what you are doing. The camshaft, however, will have to come out from the front end of the engine where the timing gear case has been removed.

The bushings or bearings are not capable of being adjusted and are held in place by set screws. When the camshaft is taken out the bearings should also be taken out and checked on the shaft, and if there is any perceptible looseness they should be replaced. It is suggested that, if possible, this work should be done by a Buick station, equipped to handle this sort of work, but any good mechanic should be able to do this with the suggestions as above outlined. We believe the most likely place for this trouble is in the camshaft and that it is not very likely that the pumpshaft is causing the trouble.

Truing Crank Pins and Checking Connecting Rods

Q—We have just finished reading an article in *MOTOR AGE* on the question of fitting engine bearings, and would like to ask a few questions. On page 17, Fig. 10 of the article in the Nov. 9 issue, it states that the crankpins should be reground if more than .0025 out of round. We would like to know if it is possible to use one of the crankpin tools on the market instead of sending the crankshaft away to be reground, as this would mean considerable delay.

1—We understand that it is possible to use crankpin tools with fair results and we are under the impression that the crankpin tools that have six or eight cutters are preferable to the type in which only one cutter is used. This is due to the fact that with a large number of cutters there is a greater chance of

getting circularity, whereas with one cutter only it is not so easy to get a true job.

2—In the same article, on page 19, at the top of the left hand column, it states that bearing mandrels can be used for testing the straightness of connecting rods and we would like to know just how this is accomplished.

2—Figure 1 shows a bearing mandrel being used for testing the straightness of the rod. In the illustration it will be seen that the square does not line up with the side of the piston and this shows that the connecting rod would have to be bent to the right a little bit in order to square up the piston with the cylinder bore. If put in as shown the upper left corner of the piston and the lower right corner of the piston would scrape against the cylinder walls, causing excess wear and oil pumping. In Fig. 2 a method is shown of checking connecting rods to see that they are not twisted. The rod shown is slightly twisted for if it was straight the test pins or wrist pins shown at the upper end of the connecting rod would hit the two test blocks at the same time.

3—Give name of publisher and title of book treating on engine overhaul work.
—Walter O. Wilson, New Ross, Ind.

3—This information will be given by letter.

ENGINE SPEEDS CAR SPEEDS AND GEAR RATIOS

Q—What is the maximum crankshaft speed of the 1922-1923 Maxwell engine?

1—The factory information on this is not available but from local dealers we have been informed that the maximum speed is 2500 to 2600 r.p.m.

2—With a rear axle gear ratio of 4.59 to 1, what would be the maximum speed of car in miles per hour?

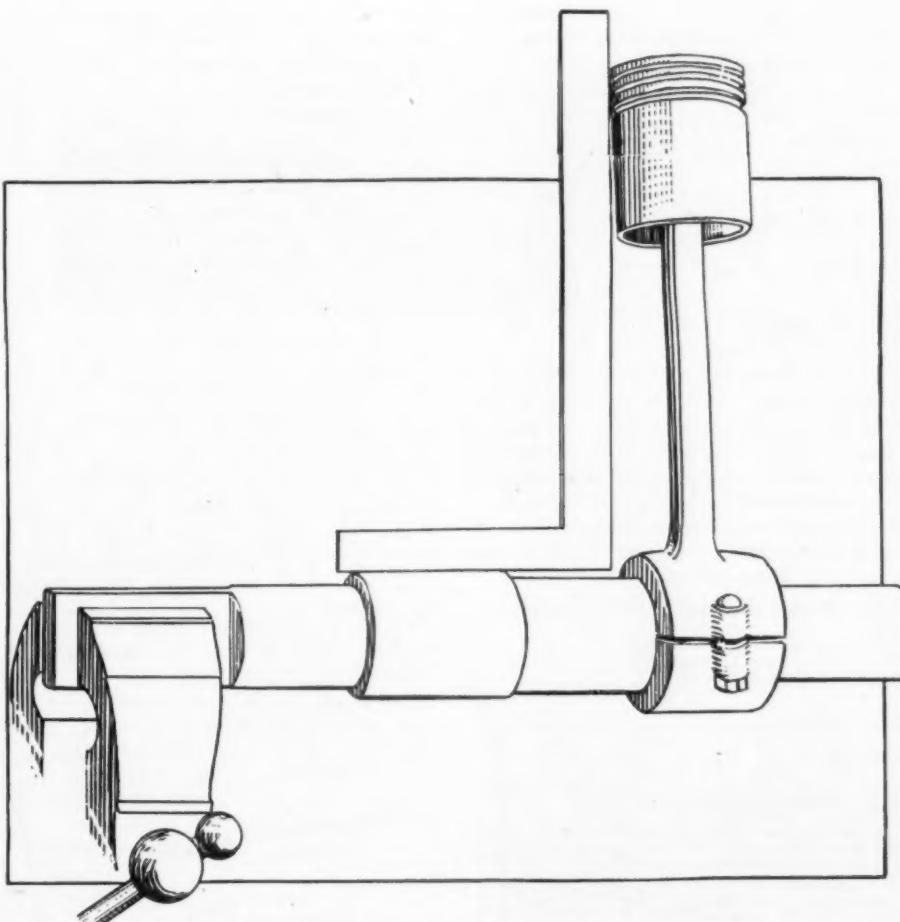
2—Assuming a maximum speed of 2500 without any allowance for slippage the car should do 51 m.p.h. at 2500 r.p.m. and 54 m.p.h. at 2600 r.p.m.

3—The Maxwell Company can furnish gears with a ratio of $4\frac{1}{2}$ to 1. What speed would you be able to get with these gears?

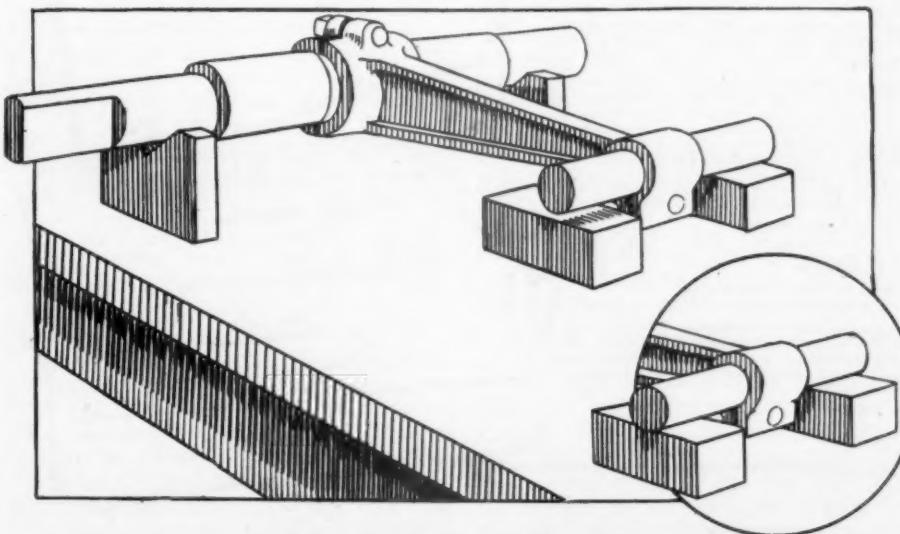
3—The theoretical speed of a car using $4\frac{1}{2}$ to 1 ratio would be at 2500 and 2600 r.p.m., 54 and 56 m.p.h. In this case and as in the case before mentioned a reduction of approximately 3 to 5 per cent should be made in order to secure the actual speed in m.p.h.

4—Would installing the $4\frac{1}{2}$ gears make any noticeable difference in the power as developed by the engine with 4.59 to 1 ratio?—Melvin C. Furseth, Evansville, Wis.

4—The lower ratio, that is the $4\frac{1}{2}$ to 1, will no doubt make a noticeable difference in the power delivered by the engine, especially if the car is operated in hilly country. If no vibration is being felt from the engine with the present gear ratio we would not advise changing it unless you wish to make the change entirely for speed purposes. All other things being equal the lower gear ratio will strain the engine considerably more than will a high ratio which will allow the engine to run without laboring.



Using mandrel to check straightness of connecting rod



Checking to see if rod is twisted

Manual of Used Car Cooperation

Pamphlet Compiled by National Association of Show and Association Managers Embodies Recommendations of National Used Car Conference

ELIMINATION of losses on used cars taken in trades is the objective of a book recently compiled by the National Association of Automobile Show and Association Managers. It is entitled "Manual of Used Car Cooperation" and is being distributed from the offices of the association at 239 West 39th street, New York City. The price is \$2, which covers merely the cost of compilation and distribution of the 16-page pamphlet.

Co-operation among dealers in the dissemination of information affecting market values is the keynote of the book, which embodies the recommendations made at the first National Used Car Conference, held in Chicago in September, 1922. While the claim is not made that the plan is a panacea that will infallibly solve the used car problem, it is believed by the association that it is an important step forward. It is reported from Boston that dealers there have saved \$400,000

since February 1st by organized effort in this direction, and in other cities good results have been obtained, also.

The book contains a number of forms with instructions for their use. The scheme is for dealers to send to their local associations at the close of each week figures on used car transactions. A pad of report forms is furnished calling for a description of the car and allowance and sales prices.

When these reports are returned to association headquarters they are sorted according to makes, years and models. From the total sales price of each particular model there is subtracted the amount spent for repairs, and in addition at least 10 per cent of the selling price to cover overhead and other selling expenses. By dividing this result by the number of cars of each respective model sold during the period covered a fair allowance price is obtained.

In addition to market values, statistics

on the number of used cars on hand are given. These are valuable to a dealer, because if he knows that there is an accumulation of cars of any particular model, he naturally will go slow on taking such cars in trade. Each member of the association, therefore, is asked to fill out once a month a form which is contained in the manual. A description of the car and also the number of each kind on hand are given. The association then tabulates the figures and sends them out to the membership.

It is evident that the purpose of the scheme is to obviate guesswork in used car appraisals by furnishing the dealer with accurate information that will enable him to make proper allowances on cars taken in trade. The names of dealers are not used by the association in broadcasting the facts received from them, but through this system of co-operation each member of the association gets the benefit of the collective experience of the other members.

Some of the forms and instructions designed to obviate guesswork in used car appraisals

Why Batteries Go Wrong

The Good Work of the Battery Maker Comes to Naught When the Battery Dealer Falls Down On His Job

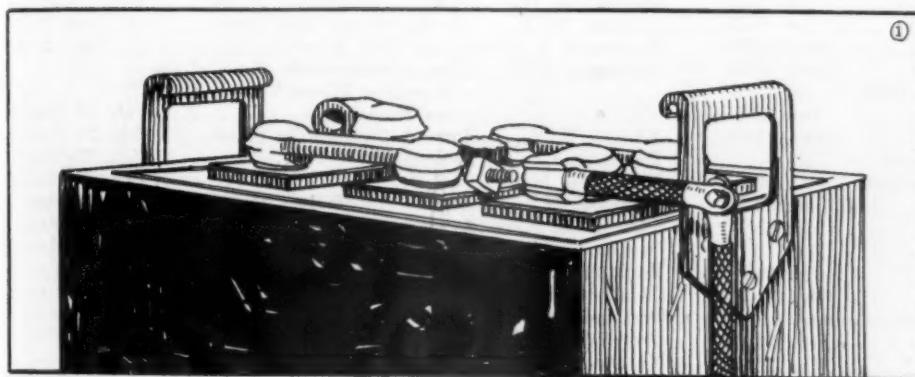


Fig. 1
An extra connection in the starter circuit is one more chance for trouble

THE Editorial Department of MOTOR AGE recently received a letter which suggested that the starting circuit on motor cars should have an extra connection as shown at Figure 1. The point was brought out that the tapered connection commonly used would often become so tight that in getting the terminal loose from the battery post there was great danger that the battery itself would be injured. The injury would consist in loosening the post in the compound, thereby causing leakage of acid or might extend to tearing the post loose from the plate assembly. The writer further stated that every battery man knows many a good battery is injured by detaching the terminals from the post.

The suggestion of making an extra connection some six inches from the post of the battery is all right in its way, but involves putting two more bolted connections in the starter circuit. Inasmuch as a great deal of starter trouble is really caused by poor contact in the starter circuit, it would seem inadvisable to put two more chances of trouble on the car. This scheme, moreover,

equipped. They are trying to save two or three dollars and in doing so take a chance of wrecking every other battery they work on. In Fig. 2 we see a pair of tongs which sell for a little over a dollar and which are adapted for re-

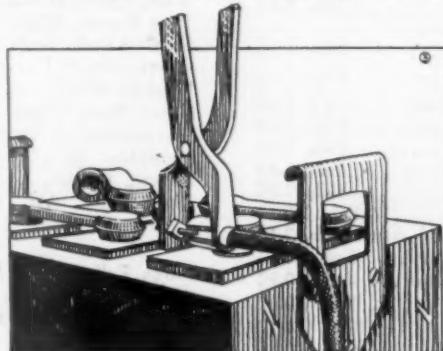


Fig. 2
A tool like this pays for itself on the first five jobs where it is used

moving tapered terminals from the battery post. The correct method of doing this is to first back off the set-screw as shown in Fig. 3 and then apply the tongs. The pressure is then transmitted from the set-screw to the tapered terminal, which is easily pushed out of the battery post. In doing this there is no strain imposed on the post and no danger of breaking it loose from the internal connections. Without a tool of this kind, however, there is, of course, great danger of damaging the battery.

Another type of battery tool can also be secured which is applicable to batteries, such as are used on Ford cars. Here the post is vertical and is either straight or tapered and the terminal on the starter cable fits over the post. The tool shown in Fig. 4 has the lower portion made in the form of a fork, the forked jaw extending under the ter-

minal. The other jaw of the tool pushes down on the post and the operation of the handles forces the terminal off without any strain on the battery post or its connection to the plates.

Many a battery station saves a few dollars on tools and equipment, while at the same time driving away many dollars' worth of business due to the use of bungling methods which wreck rather than repair the battery. The idea seems to prevail in some localities that tools of this kind are merely intended for the purpose of making money. While a battery equipment concern must, of course, show a profit to remain in business, there is no question but what the more representative equipment concerns put out a product with the idea of giving real service.

To the battery service man who is not familiar with up-to-date tools and equipment it would be an education to see work done on a large scale where practically every operation is done by some person using a special tool made for the job. It is by methods of this kind that both automobiles and their accessories can be produced in quantity and sold at low prices, and production managers recognize that only by quantity production of good material at low prices can they really show a profit.

The same general principles apply to the battery service station, and the service station that can quote a flat price on a repair job, do it in a short time with up-to-date tools and equipment, will get the business and make the money. On the other hand, the back number service station, charging for work by the hour and multiplying the hours by the use of old-fashioned methods, will drive away what business it has by its poor methods.



Fig. 4
These tongs pull up the terminal without tearing the post loose from the plates

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

New York	Annual Show	Jan. 6-13
New York	National Automobile Body Builders' Show	Jan. 8-13
Pasadena	Annual Automobile Show	Jan. 8-13
Pittston, Pa.	Annual Automobile Show	Jan. 9-13
Oakland, Cal.	Fifth Annual Show	Jan. 13-20
Buffalo	Annual Automobile Show	Jan. 13-20
Philadelphia	At the Commercial Museum Bldg.	Jan. 13-20
Hudson, N. Y.	Annual Automobile Show	Jan. 16-20
Scranton, Pa.	Commercial Car Show	Jan. 18-20
Cleveland, O.	Annual Winter Show, Cleveland Automobile Mfr's and Dealers' Assn.	Jan. 20-27
Reading, Pa.	Annual Automobile Show	Jan. 20-27
Milwaukee	Annual Automobile Show	Jan. 20-27
Baltimore	Annual Automobile Show	Jan. 20-27
Detroit	At the Municipal Garage	Jan. 20-27
Montreal	National Motor Show of Eastern Canada	Jan. 20-27
Scranton, Pa.	Annual Automobile Show	Jan. 22-27
Middletown, Conn.	Annual Automobile Show	Jan. 24-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Chicago	Annual Automobile Salón	Jan. 27-Feb. 3
Binghampton, N.Y.	Annual Automobile Show	Jan. 29-Feb. 3
Ann Arbor, Mich. ....	.....	Jan. 29-Feb. 3
Wilkes-Barre, Pa.	Annual Automobile Show	Jan. 29-Feb. 3
Portland, Ore.	Annual Automobile Show	Feb. 3-10
Pittsburgh	Semi-Annual Automobile Show	Feb. 3-10
Allentown, Pa.	Annual Automobile Show	Feb. 3-17
Minneapolis, Minn.	Annual Show	Feb. 3-10
Troy, N. Y.	Annual Automobile Show	Feb. 3-10
Winnipeg, Man.	Annual Automotive Equipment Show	Feb. 5-10
Springfield, Ill.	Annual Automobile Show	Feb. 5-10
Charlotte, N. C.	Annual Automobile Show	Feb. 5-10
Lansing, Mich. ....	.....	Feb. 5-10
Toledo	Annual Automobile Show	Feb. 5-10
Waterbury, Conn.	Annual Automobile Show	Feb. 5-12
Cincinnati	Automobile Show	Feb. 7-14
Kansas City, Mo.	Annual Automobile Show	Feb. 10-17
St. Louis	St. Louis Automobile Dealers' Assn.	Feb. 3-10
Rochester, N. Y.	Annual Automobile Show	Feb. 10-17
York, Pa.	York Dealers' Automobile Show	Feb. 10-18
Norfolk, Va.	Annual Automobile Show	Feb. 12-17
Kalamazoo, Mich. ....	.....	Feb. 12-17
Flint, Mich. ....	.....	Feb. 12-17
Fort Dodge, Ia.	Annual Automobile Show	Feb. 13-16
Orlando, Fla.	Annual Automobile Show	Feb. 13-17
Sioux City, S. D.	Annual Automobile Show	Feb. 14-17
Columbus	Annual Automobile Show	Feb. 15-21
Hartford, Conn.	Annual Automobile Show	Feb. 17-24
Atlanta	Annual Automobile Show	Feb. 17-24
San Francisco	Exposition, Auditorium	Feb. 17-24

Gr'd Rapids, Mich. ....	.....	Feb. 19-24
Mt. Clemens, Mich. ....	.....	Feb. 19-24
Louisville	Annual Automobile Show	Feb. 19-24
White Plains, N.Y.	Annual Automobile Show	Feb. 19-24
Schenectady, N. Y.	Annual Automobile Show	Feb. 19-24
Bethlehem, Pa.	Annual Automobile Show	Feb. 19-Mar. 1
Trenton, N. J.	Annual Automobile Show	Feb. 21-24
Deadwood, S. Dak.	Black Hills Show	Feb. 20-24
Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Deal- ers' Association	Feb. 24-Mar. 3
Albany, N. Y.	Annual Automobile Show	Feb. 24-Mar. 3
Des Moines, Ia.	Annual Show	Feb. 25-Mar. 5
Muskegon, Mich. ....	.....	Feb. 26-Mar. 3
Syracuse, N.Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Omaha	Annual Automobile Show	Feb. 26-Mar. 3
Yonkers	Annual Automobile Show	Feb. 26-Mar. 3
Oklahoma City	Annual Automobile Show	Feb. 26-Mar. 3
Portland, Me.	Annual Automobile Show	Feb. 26-Mar. 3
Evansville, Ind.	Annual Automobile Show	Feb. 26-Mar. 3
Malone, N. Y.	Annual Automobile Show	Feb. 28-Mar. 3
Poughkeepsie, N. Y.	Annual Automobile Show	Feb. 28-Mar. 3
Indianapolis	Indianapolis Automobile Trade Assn.	Mar. 5-10
Bay City, Mich. ....	.....	Mar. 5-10
Amsterdam, N. Y.	Annual Automobile Show	Mar. 5-10
Nashville, Tenn.	Annual Automobile Show	Mar. 5-11
Saginaw, Mich.	Annual Automobile Show	Mar. 7-11
Huntington, W.Va.	Huntington Automobile Dealers' Assn. Show	Mar. 10-6
Boston	Annual Automobile Show	Mar. 10-17
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Washington, D. C.	Spring Show, Convention Hall	Mar. 11-17
Port Huron, Mich. ....	.....	Mar. 12-17
Battle Creek, Mich. ....	.....	Mar. 19-24
Greenville, S. C.	Annual Automobile Show	Mar. 28-31
Alpena, Mich. ....	.....	Apr. 2-7
Green Bay, Wisc.	Annual Automobile Show	Aug. 27-30
Sacramento	Annual Automobile Show	Sept. 3-8
Memphis	Annual Automobile Show	Sept. 23-30
Fresno, Calif.	Annual Automobile Show	Sept. 28-Oct. 5
Little Rock, Ark.	Annual Automobile Show	Oct. 8-13

CONVENTIONS

Sioux Falls, Ia.	Annual Meeting, Automobile Trades Associaction of South Dakota	Jan. 15
Detroit	Annual Convention Michigan Automotive Trade Association	Jan. 24
Chicago	Annual Meeting, Automotive Electric Service Association	Jan. 29-31
Quincy, Ill.	Annual Meeting Illinois Automotive Trade Association	Mar. 19

RACES

San Diego, Calif.	January
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SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

O-o-o-, look at us now—if they don't quit having automobile shows, we'll pass out altogether.

Some one has got to come to our rescue—this is an out and out plea for help. We want contributions and we'll do anything (almost) to get them.

Tom Walsh who has been an ardent supporter threatens to quit if he doesn't get some rises somewhere so get out an envelope and mail us something which will tickle your fellow laborers.

Ray Sherman sends us one which he found out on the Utah desert.

"He had no stop signal—he made a turn,
His ashes almost filled the urn."

Not so bad, not so bad.

Not so good, either.

Aw, c'mon, fellers, send us some cracks — *succor! succor!*

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive					
			Front	Rear					Front	Rear					Front	Rear						
Ace.....	30 11-12	\$2400	3 1/2 x 5	34 x 3 1/2	34 x 6	W	Corbitt.....	E-22	1	\$1480	3 1/2 x 5	34 x 3 1/2	34 x 4	W	Gary.....	K	3 1/2	\$3790	4 1/2 x 6	36 x 5	40 x 5d	W
Ace.....	40 2	2850	4 1/2 x 5 1/4	36 x 4	36 x 7	W	Corbitt.....	D-22	1 1/2	2200	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Gary.....	M	5	4450	5 x 6 1/2	36 x 6	40 x 6d	W
Ace.....	60 2 1/2-3	3400	4 1/2 x 5 1/4	36 x 4	36 x 8	W	Corbitt.....	C-22	2	2600	4 1/2 x 5 1/4	36 x 3 1/2	36 x 7	W	Gersix.....	M	1 1/2	3100	4 x 5 1/2	36 x 3 1/2	36 x 7	W
Ace.....	20 1	...	3 1/2 x 5	35 x 5	35 x 5n	W	Corbitt.....	B-22	2 1/2	3000	4 1/2 x 5 1/4	36 x 4	36 x 7	W	Gersix.....	K	2 1/2	3500	4 1/2 x 5 1/2	36 x 4	36 x 8	W
Ace.....	30 1 1/2	...	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Corbitt.....	R-22	3	3200	4 1/2 x 5 1/4	36 x 4	36 x 8	W	Gersix.....	3 1/2	4500	4 1/2 x 6	36 x 5	40 x 12	W	
Ace.....	40 2	...	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Corbitt.....	A-22	3 1/2-4	3800	4 1/2 x 5 1/2	36 x 5	36 x 10	W	Gofredson.....	B	1	2075	3 1/2 x 5 1/2	34 x 5	34 x 5	W
Ace.....	60 3	...	4 1/2 x 5 1/4	36 x 4	36 x 7	W	Corbitt.....	AA-22	5	4500	4 1/2 x 6	36 x 6	40 x 6d	W	Gofredson.....	31 1 1/2-2	3000	4 x 5 1/4	36 x 5	38 x 7n	W	
Ace.....	60L 3	...	4 1/2 x 5 1/2	36 x 4	36 x 7k	W	Corbitt.....	W	Gofredson.....	A	2 1/2	3375	4 x 5 1/4	36 x 4	36 x 7	W
Ace.....	90 4 1/2	...	4 1/2 x 5 1/2	36 x 5	40 x 10	W	Corbitt.....	W	Gofredson.....	B	3 1/4	4475	4 1/2 x 5 1/2	36 x 5	36 x 10	W
Ace.....	125 6 1/4	...	4 1/2 x 6	36 x 6	40 x 12	W	Corbitt.....	W	Gofredson.....	100	5-6	5500	5 x 5 1/2	36 x 6	40 x 14	W
American.....	25 2 1/2	3350	4 x 6	36 x 1k	36 x 8d	W	Day-Elder.....	AS	1	1600	3 1/2 x 5	35 x 5n	35 x 5n	W	Graham Bros.....	1	1265	3 1/2 x 5 1/2	33 x 4 1/2	34 x 5n	W	
American.....	40 4	4275	4 1/2 x 6	36 x 5	36 x 8d	W	Day-Elder.....	B	1 1/2	2000	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Graham Bros.....	1 1/2	1325	3 1/2 x 4 1/2	33 x 4 1/2	36 x 6n	B	
American.....	50 5	4500	4 1/2 x 6	36 x 5	36 x 12	W	Day-Elder.....	D	2	2400	4 1/2 x 5 1/4	36 x 4	36 x 7	W	Gramm-Pion.....	10	1245	3 1/2 x 5	33 x 5n	33 x 5n	J	
Armed.....	20 1	...	3 1/2 x 5 1/4	34 x 3 1/2	34 x 6	W	Day-Elder.....	C	2 1/2	2750	4 1/2 x 5 1/4	36 x 4	36 x 7	W	Gramm-Pion.....	15	1 1/2-2	1750a	3 1/2 x 5	36 x 3 1/2	36 x 5k	
Armed.....	20 1	...	3 1/2 x 5 1/4	34 x 3 1/2	34 x 6k	W	Day-Elder.....	F	3 1/2	3150	4 1/2 x 5 1/2	36 x 5	36 x 5d	W	Gramm-Pion.....	65	1 1/2-2	2250a	3 1/2 x 5	36 x 3 1/2	36 x 5	
Armed.....	21 1 1/2	...	3 1/2 x 5 1/4	34 x 3 1/2	34 x 6k	W	Day-Elder.....	E	5	4250	4 1/2 x 6	36 x 5k	40 x 6dk	W	Gramm-Pion.....	20	2 1/2-3	2475a	4 1/2 x 5 1/4	36 x 4	36 x 7k	
Armed.....	40-C 1 1/2	...	4 1/2 x 5 1/4	34 x 3 1/2	34 x 6k	W	Dehorn.....	E	1	1600	3 1/2 x 5 1/4	35 x 5	35 x 5n	W	Gramm-Pion.....	30	3	3300a	4 1/2 x 5 1/2	36 x 5k	36 x 5dk	
Armed.....	HW-C 2 1/2	...	4 1/2 x 5 1/2	36 x 4	36 x 7k	W	Dehorn.....	F	1 1/2	2300	3 1/2 x 5 1/4	34 x 4	34 x 5	W	Gramm-Pion.....	75P	3 1/4	4225a	4 1/2 x 5 1/2	36 x 6	42 x 9n	
Armed.....	HW-C 2 1/2	...	4 1/2 x 5 1/4	36 x 4	36 x 7k	W	Dehorn.....	G	1 1/2	2180	3 1/2 x 5 1/4	34 x 4	34 x 5	W	Gramm-Pion.....	40	4	3850a	4 1/2 x 5 1/2	36 x 5	36 x 5dk	
Armed.....	KW-C 3 1/2	...	4 1/2 x 6	36 x 5	36 x 5d	W	Dehorn.....	H	2	2590	3 1/2 x 5 1/4	34 x 4 1/2	34 x 7	W	Gramm-Pion.....	50	5-6	4450a	4 1/2 x 6	36 x 6	40 x 6dk	
Armed.....	KW-C 3 1/2	...	4 1/2 x 6	36 x 5	36 x 5d	W	Defiance.....	G	1	1525	3 1/2 x 5	35 x 5	35 x 5n	B	Hall.....	...	...	...	...	...	...
*Atlas.....	22 1	1495	3 1/2 x 5 1/4	34 x 4 1/2	34 x 4 1/2n	W	Defiance.....	H	1 1/2	1845	3 1/2 x 5	35 x 5n	36 x 6n	I	Hall.....	...	...	...	...	...	...
*Atlas.....	44 1 1/2-2	1950	3 1/2 x 5 1/4	36 x 6	36 x 10n	W	Defiance.....	I	2	2075	3 1/2 x 5	35 x 5n	38 x 7n	W	Hall.....	...	...	...	...	...	...
Atterbury.....	20R 1 1/2	2175	3 1/2 x 5	34 x 3 1/2	34 x 5	W	Denby.....	31	1 1/4	1485	3 1/2 x 5	35 x 5	35 x 5n	B	Hall.....	...	...	...	...	...	...
Atterbury.....	22C 2 1/2	3375	3 1/2 x 5 1/4	36 x 4	36 x 4d	W	Denby.....	31	1 1/4	2145	3 1/2 x 5	35 x 5	35 x 5n	I	Hall.....	...	...	...	...	...	...
Atterbury.....	22C 2 1/2	3475	3 1/2 x 5 1/4	36 x 4	36 x 4d	W	Denby.....	31 2 1/2-3	2795	4 1/2 x 5 1/4	36 x 4	36 x 7	I	Hall.....	...	...	...	...	...	...
Atterbury.....	22D 3 1/2	3275	4 1/2 x 5 1/2	36 x 5	40 x 5d	W	Denby.....	27	4	3895	4 1/2 x 5 1/2	36 x 5	36 x 5d	I	Hall.....	...	...	...	...	...	...
Atterbury.....	22D 3 1/2	3475	4 1/2 x 5 1/2	36 x 5	40 x 5d	W	Denby.....	210	5	4295	4 1/2 x 5 1/2	36 x 6	40 x 6d	I	Hall.....	7 chain	7	5100	4 1/2 x 5 1/2	36 x 5	40 x 6d	C
Atterbury.....	8E 5	4975	4 1/2 x 6	36 x 5	40 x 6d	W	Dependable.....	A 3 1/2	1650	3 1/2 x 5 1/4	34 x 5n	36 x 6n	W	Harvey.....	W OA	2	2650	4 1/2 x 5 1/4	34 x 4	34 x 7	W	
Atterbury.....	8E 5	5125	4 1/2 x 6	36 x 5	40 x 6	W	Dependable.....	C 2 1/2	2350	3 1/2 x 5 1/4	34 x 3 1/2	34 x 5	W	Harvey.....	W FA	2 1/2	2950	4 1/2 x 5 1/2	36 x 4	36 x 7	W	
Autocar.....	21UF 1 1/2-2	1950	4 1/2 x 4 1/2	34 x 4	34 x 6	D	Dependable.....	D 2 1/2	2650	4 x 5	34 x 5	36 x 6	W	Harvey.....	W WHA	3 1/2	3550	4 1/2 x 6	36 x 5	36 x 5d	W	
Autocar.....	21UF 1 1/2-2	2050	4 1/2 x 4 1/2	34 x 4	34 x 6	D	Dependable.....	E 3	2950	4 1/2 x 5 1/2	36 x 5	36 x 6	W	Hawkeye.....	K	1	1615	3 1/2 x 5 1/4	34 x 3 1/2	34 x 5k	I	
Autocar.....	27H 2-3	2950	4 x 5 1/2	34 x 5	36 x 7	D	Diamond T.....	O-3 1-1/4	1975	3 1/2 x 5 1/4	36 x 3 1/2	36 x 4n	W	Hawkeye.....	M	2	2145	4 1/2 x 5	36 x 4k	36 x 6k	I	
Autocar.....	27K 2-3	3075	4 x 5 1/2	34 x 5	36 x 7k	D	Diamond T.....	U 2-2 1/2	2250	3 1/2 x 5 1/4	36 x 3 1/2	36 x 5	W	Hawkeye.....	N	3 1/2	3700	4 1/2 x 6 1/2	36 x 5k	36 x 10k	I	
Autocar.....	26Y 4-6	3950	4 1/2 x 5 1/2	34 x 6	36 x 12	D	Diamond T.....	K 3 1/2	3750	4 1/2 x 5 1/2	36 x 5	36 x 6d	W	Hendrickson.....	O 1 1/2	2400	3 1/2 x 5 1/2	36 x 5	36 x 5m	W		
Autocar.....	26B 4-6	4100	4 1/2 x 5 1/2	34 x 6	36 x 12	D	Diamond T.....	EL 5	4325	4 1/2 x 5 1/2	36 x 6	40 x 6d	W	Hendrickson.....	N 2 1/2	2690	4 1/2 x 5 1/2	36 x 4	36 x 7k	W		
Available.....	H1 1 1/2	2475	4 x 5	36 x 1 1/2	36 x 5k	W	Diamond T.....	S 5	4500	4 1/2 x 6	36 x 6	40 x 6d	W	Hendrickson.....	M 3 1/2	3000	4 1/2 x 6	36 x 5	36 x 5dk	W		
Available.....	H2 2	2775	4 x 5	36 x 3	36 x 6k	W	Doane.....	2 1/2	4100b	4 1/2 x 5 1/4	36 x 5	36 x 7	W	Hendrickson.....	K 5	4000	5 x 6 1/4	36 x 6	40 x 6	W		
Available.....	H2 2 1/2	3160	4 x 5	36 x 4k	36 x 8k	W	Doane.....	3	5100b	4 1/2 x 5 1/4	36 x 5	36 x 6d	C	Huffman.....	B 1 1/2-2	1795	3 1/2 x 5	34 x 3 1/2	34 x 6	W		
Available.....	H3 3 1/2	4175	4 1/2 x 5 1/2	36 x 5	40 x 5d	W	Doane.....	6	6000b	5 x 6	36 x 6	40 x 6d	C	Huffman.....	C 1 1/2-2	1695	3 1/2 x 5 1/2	36 x 3 1/2	36 x 6	I		
*Buick.....	55 5735	5 x 6	36 x 6	40 x 12	W	Doane.....	7	6000b	5 x 6	36 x 6	40 x 6d	W	Huffman.....	D 2-3	2895	4 1/2 x 5 1/2	36 x 4	36 x 7	W			
*Buick.....	1 1/2	...	3 1/2 x 4	34 x 5n	34 x 5n	I	*Dodge Brothers.....	1	730	3 1/2 x 4 1/2	32 x 4n	32 x 4n	I	Hurlbert.....	A-A 1 1/2	1950	3 1/2 x 5	34 x 5	34 x 5n	W		
*Buick.....	...	...	3 1/2 x 4	34 x 5n	34 x 5n	I	*Dodge Brothers.....	2	730	4 1/2 x 5 1/2	36 x 8	36 x 8	I	Hurlbert.....	B-B 2 1/2-3	2800	4 1/2 x 5 1/2	36 x 4	36 x 4d	W	
*Buick.....	...	...	3 1/2 x 4	34 x 5n	34 x 5n	I	*Dodge Brothers.....	3	730	4 1/2 x 5 1/2	36 x 8	36 x 8	I	Hurlbert.....	C-C 3 1/2-3	3475	4 1/2 x 5 1/2	36 x 5	36 x 5d	W	
*Buick.....	...	...	3 1/2 x 4	34 x 5n	34 x 5n	I	*D														

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive			
				Front	Rear					Front	Rear					Front	Rear				
Kleiber... BB	2	\$3600	4 ¹ / ₂ x5 ¹ / ₂	36x4k	36x7k	W	Ogden.... A2	1	...	3 ¹ / ₂ x5	34x5n	34x5n	W	Selden.... 70	31 ¹ / ₂ -5	\$3750	1 ¹ / ₂ x5 ¹ / ₂	36x5	36x10	W	
Kleiber... B	2 ¹ / ₂	3950	4 ¹ / ₂ x5 ¹ / ₂	36x5k	36x8	W	Ogden.... D	1 ¹ / ₂	...	3 ¹ / ₂ x5	36x3 ¹ / ₂	36x5	W	Selden.... 90	5-7	4950	1 ¹ / ₂ x5	36x6	40x12	W	
Kleiber... C	3 ¹ / ₂	4600	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Ogden.... E	2 ¹ / ₂	...	1 ¹ / ₂ x5 ¹ / ₂	36x1	36x8	W	Senea.... M	1 ¹ / ₂	820	3 ¹ / ₂ x5 ¹ / ₂	30x3 ¹ / ₂	30x3 ¹ / ₂	B	
Kleiber... D	5	5300	5 x ¹ / ₂	36x6	40x12	W	Old Hickory.... W	1	\$1775	3 ¹ / ₂ x5	36x3 ¹ / ₂	36x1k	W	*Service.... 12	1 ¹ / ₂	...	3 ¹ / ₂ x5 ¹ / ₂	32x4 ¹ / ₂	32x4 ¹ / ₂	B	
Koehler.... D	1 ¹ / ₂	2150	3 ¹ / ₂ x5 ¹ / ₂	34x3 ¹ / ₂	34x5	W	Old Reliable.... A	1 ¹ / ₂	2350	1 x ¹ / ₂	34x4	36x6	W	*Service.... 25	1 ¹ / ₂	...	3 ¹ / ₂ x5 ¹ / ₂	34x5	34x5	W	
Koehler.... M	2 ¹ / ₂	3175	4 x ¹ / ₂	36x4	36x7	W	Old Reliable.... B	2 ¹ / ₂	3500	4 ¹ / ₂ x6	34x4	36x4d	W	Service.... 21	1 ¹ / ₂	...	3 ¹ / ₂ x5 ¹ / ₂	34x3 ¹ / ₂	34x5	W	
Koehler.... MCS	2 ¹ / ₂	3275	4 x ¹ / ₂	36x4	36x7	W	Old Reliable.... C	3 ¹ / ₂	4250	4 ¹ / ₂ x6	36x5	36x5d	W	Service.... 32	2	...	4 x ¹ / ₂	36x3 ¹ / ₂	36x7	W	
Koehler.... F	3 ¹ / ₂	4470	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x10	W	Old Reliable.... D	5	5000	4 ¹ / ₂ x6	36x6	40x6d	C	Service.... 37	3	...	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	
Koehler, MT. Trac	5	3275	4 x ¹ / ₂	36x4	36x7	W	Old ReliableKLM	7	6000	4 ¹ / ₂ x6 ¹ / ₂	35x5	35x5n	W	Service.... 72	3 ¹ / ₂	...	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	
Krebs.... E	3 ¹ / ₂	1360	3 ¹ / ₂ x4 ¹ / ₂	34x4 ¹ / ₂	34x4 ¹ / ₂	W	*Oldsmobile Econ	1	1095	3 ¹ / ₂ x5 ¹ / ₂	35x5	36x8	W	Service.... 77	4	...	4 ¹ / ₂ x6	36x6	40x6d	W	
Krebs.... E	24	1675	3 ¹ / ₂ x5	34x5	34x5	W	Olympic.... A	2 ¹ / ₂	3200	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Service.... 102	6	...	3 ¹ / ₂ x5 ¹ / ₂	34x5	36x6n	W	
Krebs.... E	45	2275	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Olympic.... B	3 ¹ / ₂	2825	4 x ¹ / ₂	36x3 ¹ / ₂	36x7	W	Signal.... NF	1 ¹ / ₂	...	4 ¹ / ₂ x5 ¹ / ₂	34x5	36x6	W	
Krebs.... E	75	2550	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Olympic.... C	2 ¹ / ₂	3200	4 x ¹ / ₂	36x4	36x8	W	Signal.... H	1 ¹ / ₂	...	4 ¹ / ₂ x5 ¹ / ₂	34x4	36x8	W	
Krebs.... E	110	3175	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x10	W	Olympic.... D	5	4725	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x12	W	Signal.... J	2 ¹ / ₂	...	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x5d	W	
Krebs.... E	140	5	...	4 ¹ / ₂ x6	36x6	40x6d	W	Olympic.... E	9	2485	3 ¹ / ₂ x5	36x6n	36x8	W	Signal.... M	3 ¹ / ₂	...	4 ¹ / ₂ x6	36x6	40x6d	W
Larrabee.... X-2	1	1925	3 ¹ / ₂ x4 ¹ / ₂	34x5n	34x5n	B	Oshkosh.... A	2	3485	4 x ¹ / ₂	38x7n	38x7n	B	*Standard.... 75	1 ¹ / ₂	1330	3 ¹ / ₂ x5 ¹ / ₂	34x3 ¹ / ₂	34x5	33x5n	W
Larrabee.... U	1 ¹ / ₂	2400	3 ¹ / ₂ x5	34x3 ¹ / ₂	34x5	W	Oshkosh.... B	2 ¹ / ₂	3585	4 x ¹ / ₂	38x7n	38x7n	B	Standard.... 1-K	1 ¹ / ₂	1600	3 ¹ / ₂ x5 ¹ / ₂	36x4k	34x5k	34x5k	W
Larrabee.... J	1 ¹ / ₂	2400	3 ¹ / ₂ x4 ¹ / ₂	34x3 ¹ / ₂	34x5k	W	Oshkosh.... C	2 ¹ / ₂	425	3 ¹ / ₂ x4 ¹ / ₂	30x3 ¹ / ₂	30x3 ¹ / ₂	B	Standard.... 76	2 ¹ / ₂ -3	2400	4 ¹ / ₂ x5 ¹ / ₂	36x4k	36x8	W	
Larrabee.... K	2 ¹ / ₂	3100	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Oshkosh.... D	5	475	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x10	W	Standard.... 65	3 ¹ / ₂ -5	3150	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x12	W	
Larrabee.... K-5	2 ¹ / ₂	3450	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Oshkosh.... E	9	2485	3 ¹ / ₂ x5	36x6n	36x8	W	Standard.... 5-K	5-7	4400	4 ¹ / ₂ x6	36x6	40x14	W	
Larrabee.... L	3 ¹ / ₂ -5	4000	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Oshkosh.... F	12	3585	4 x ¹ / ₂	38x7n	38x7n	B	*Star.... 1 ¹ / ₂	6	610b	3 ¹ / ₂ x5 ¹ / ₂	30x3 ¹ / ₂	30x3 ¹ / ₂	30x3 ¹ / ₂	W
Larrabee.... L	7 ¹ / ₂	4800	4 ¹ / ₂ x6	36x6	40x6d	W	Packard.... EC	2-3	3100	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Sterling.... 1 ¹ / ₂	2885	2885	4 x ¹ / ₂	36x4	36x6	W	
Larrabee.... AB D.R.	1 ¹ / ₂	3450	1 x ¹ / ₂	36x4	36x4d	W	Packard.... EX	2-2 ¹ / ₂	3100	4 ¹ / ₂ x5 ¹ / ₂	36x6n	40x8n	W	Sterling.... 2 ¹ / ₂	3085	3085	4 x ¹ / ₂	36x4	36x6	W	
Maccar.... H-A	2	...	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x4d	W	Packard.... ED	3 ¹ / ₂ -4	4100	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Sterling.... 2 ¹ / ₂	3290	19 ¹ / ₂	38x5 ¹ / ₂	36x4k	36x4d	W	
Maccar.... H-2	3	...	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Packard.... EF	5-7 ¹ / ₂	4500	5 x ¹ / ₂	36x6	40x6d	W	Sterling.... 3 ¹ / ₂	4325	4325	4 ¹ / ₂ x6 ¹ / ₂	36x5k	40x5d	W	
Maccar.... M-3	4	...	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x6d	W	Packard.... PA	52-19	1950	4 x ¹ / ₂	34x3 ¹ / ₂	34x5	W	Packard.... 5-W	5	4950	5 x ¹ / ₂	36x4	40x6d	C	
Maccar.... G-6	5	...	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x6d	W	Packard.... PA	54-20	2420	4 ¹ / ₂ x5 ¹ / ₂	34x4	34x8	W	Packard.... 5-C	5	5500	5 x ¹ / ₂	36x6	40x6d	C	
MacDonald.... A	7 ¹ / ₂	5750	1 ¹ / ₂ x28	40x7	40x14	I	Packard.... PA	54-18	3145	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Packard.... 5-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x7d	I	
Mack.... AB Chain	1 ¹ / ₂	3000	1 x ¹ / ₂	36x4	36x4d	W	Packard.... PA	54-22	3145	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AB D.R.	2 ¹ / ₂	3750	1 ¹ / ₂ x5	36x4	36x4d	W	Packard.... PA	54-23	3200	4 x ¹ / ₂	34x4	36x4d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AB Chain	3 ¹ / ₂	3850	1 ¹ / ₂ x5	36x4	36x4d	W	Packard.... PA	54-24	3200	4 x ¹ / ₂	34x4	36x4d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AB D.R.	2	3750	1 ¹ / ₂ x5	36x4	36x4d	W	Pierce-Arrow.... A	2	3200	4 x ¹ / ₂	36x4	36x4d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AB Chain	2 ¹ / ₂	3850	1 ¹ / ₂ x5	36x4	36x4d	W	Pierce-Arrow.... B	3	3200	4 x ¹ / ₂	36x4	36x4d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AC Chain	3 ¹ / ₂	4950	5 x ¹ / ₂	36x5	40x5d	W	Pierce-Arrow.... C	4	3450	4 ¹ / ₂ x6 ¹ / ₂	36x5	36x5d	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AC Chain	5 ¹ / ₂	5500	5 x ¹ / ₂	36x6	40x6d	W	Pittsburgh.... 1	1 ¹ / ₂ -2	3000	3 ¹ / ₂ x5	36x4	36x7	W	Packard.... 7-C	7 ¹ / ₂	6000	5 x ¹ / ₂	36x4	40x14	W	
Mack.... AC Chain	7 ¹ / ₂	6100	5 x ¹ / ₂	36x7	40x7d	C	Pittsburgh.... 2	1 ¹ / ₂ -2	3000	3 ¹ /<											

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	TIRES		Final Drive			
			Front	Rear					Front	Rear					Front	Rear				
Veteran..... ^P	2	\$3000	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x7	W	White..... ^A	40	3 $\frac{1}{2}$	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x5	40x5d	D	Wichita..... ^O	4	\$3500	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x5k	36x5k	W
Veteran..... ^R	3	4200	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x7	W	White..... ^W	45	5	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x6	40x6d	D	Wilcox..... ^{AA}	1	1900	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4k	36x4k	W
Veteran..... ^S	4	5395	4 $\frac{1}{2}$ x 6	36x5	36x10	W	White Hick..... ^E	1	1225	3 $\frac{1}{2}$ x 5	34x3n	34x5n	W	Wilcox..... ^{BB}	1 $\frac{1}{2}$	2550	4 $\frac{1}{2}$ x 5	36x4	36x5	W
*Vim..... ⁵⁰	3 $\frac{1}{2}$ -4	995	4 x 5	32x4n	32x4n	B	White Hick..... ^H	1 $\frac{1}{2}$	1375	3 $\frac{1}{2}$ x 5	36x3 $\frac{1}{2}$	36x5	W	Wilcox..... ^D	2 $\frac{1}{2}$	3000	4 $\frac{1}{2}$ x 5	36x4k	36x3 $\frac{1}{2}$ dk W	
Walker-Johnson ^A	2	2500	3 $\frac{1}{2}$ x 5	34x3 $\frac{1}{2}$	34x6	W	White Hick..... ^K	2 $\frac{1}{2}$	1675	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x5	W	Wilcox..... ^E	3 $\frac{1}{2}$	3550	4 $\frac{1}{2}$ x 6	36x5k	36x5d	W
Walker-Johnson ^B	3	3000	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x8	W	Wichita..... ^K	1	1875	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x3 $\frac{1}{2}$	36x4k	W	Wilcox..... ^F	5	4350	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x5	40x6d	W
Walter..... ^M	2 $\frac{1}{2}$	3850	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x8	W	Wichita..... ^M	2	2400	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x3 $\frac{1}{2}$	36x6k	W	Wilson..... ^F	1 $\frac{1}{2}$	2270	3 $\frac{1}{2}$ x 5	36x3 $\frac{1}{2}$	36x5	W
Walter..... ^S	5	4850	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x4	40x6d	W	Wichita..... ^{RX}	3	3200	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4k	36x8k	W	Wilson..... ^G	3 $\frac{1}{2}$	3685	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x5	36x7	W
*Watson..... ^C	1	14650	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	35x5n	35x5n	W	Wilson..... ^H	5	4520	4 $\frac{1}{2}$ x 6	36x6	40x6	W	Wilson..... ^A	1	1750	3 $\frac{1}{2}$ x 5	34x5n	34x5n	W
Watson..... ^N	3 $\frac{1}{2}$	4250	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x5	36x10	W	Wisconsin..... ^B	1 $\frac{1}{2}$	2100	3 $\frac{1}{2}$ x 5	35x5	36x6	W	Wisconsin..... ^C	2 $\frac{1}{2}$	2700	4 x 5 $\frac{1}{2}$	36x6n	36x7	W
Western..... ^{W1}	1 $\frac{1}{2}$	2450	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x3 $\frac{1}{2}$	36x5k	W	Wisconsin..... ^D	3 $\frac{1}{2}$	3000	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x6n	40x8	W	Wisconsin..... ^E	5	3500	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x6	36x10	W
Western..... ^{L1}	1 $\frac{1}{2}$	2450	3 $\frac{1}{2}$ x 5	36x3 $\frac{1}{2}$	36x5k	W	Wisconsin..... ^F	7	4000	5 x 6 $\frac{1}{2}$	36x6	36x12	W	Witt-Will..... ^I	1 $\frac{1}{2}$	2450	3 $\frac{1}{2}$ x 5	36x3 $\frac{1}{2}$	36x6k	W
Western..... ^{L2}	2 $\frac{1}{2}$	3250	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4	36x7	W	Witt-Will..... ^P	2 $\frac{1}{2}$	2900	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x4k	36x8k	W							
*White..... ¹⁵	3 $\frac{1}{2}$	4000	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x6	40x5d	W														
White..... ²⁰	2	3250	3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	34x5n	34x5n	B														

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.

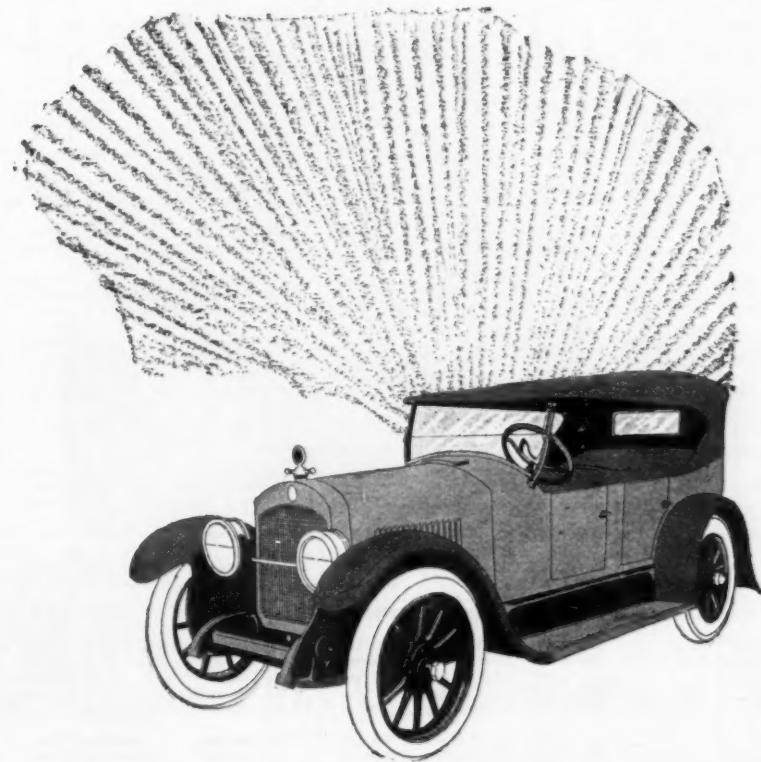
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bare, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bare, Stroke	Fuel	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bare, Stroke	Fuel		
Allis-Chal.G.P.	6-12	\$295	2	Le.R.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	1	Gray.....	18-36	1975	3	Wauk.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	Gas.	4	OilPull..... ^E	30-60	...	4	Own	2-10x12	K,D	8-10
Allis-Chalm.	15-25	1185	4	Midw.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	3	Hart-Parr..... ^A	20	...	4	Own	2-5 $\frac{1}{2}$ x 6 $\frac{1}{2}$	K,D	2	*Oldmar..... ^K	2 $\frac{1}{2}$ -5	\$225	4	Own	1-5 $\frac{1}{2}$ x 5 $\frac{1}{2}$	K,D	8-10
Allis-Chalm.	20-35	1885	4	Own	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	GorK	3	Hart-Parr..... ^B	30	...	4	Own	2-6 $\frac{1}{2}$ x 7	K,D	3	Pioneer..... ^G	18-36	...	4	Own	4-5 $\frac{1}{2}$ x 6	G,K,D	4
Allwork..... ^{2-G}	14-28	1595	4	Own	4-4 $\frac{1}{2}$ x 6	GorK	3	Hart-Parr..... ^C	8-10	...	4	Own	6 $\frac{1}{2}$ x 7	K,D	3	Pioneer..... ^C	40-75	...	4	Own	4-7 x 8	G,K,D	10
Allwork..... ^C	14-28	1293	4	Own	4-5 x 6	GorK	3	Heider..... ^D	9-16	628	4	Wauk.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	G,K	2								
*ARO.1921-22	3-6	385	4	Own	1-1 $\frac{1}{2}$ x 5	Gas.	1	Heider..... ^E	12-20	725	4	Wauk.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K	1	Russell..... ^A	12-24	...	4	Own	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	GorK	2-3
Aultman..... ^T	15-30	...	4	Clim.	4-5 x 6 $\frac{1}{2}$	G,K,D	4	Heider..... ^F	12-25	1725	4	Wauk.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K	3	Russell..... ^B	15-30	...	4	Own	4-5 x 6 $\frac{1}{2}$	GorK	3-4
Aultman..... ^T	22-45	...	4	Own	4-5 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K,D	6	Heider..... ^G	12-25	1975	4	Wauk.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K	3	Russell..... ^C	20-35	...	4	Own	4-5 $\frac{1}{2}$ x 8	GorK	4-5
Aultman..... ^T	30-60	...	4	Own	4-7 x 9	G,K,D	8-10	Huber..... ^H	12-25	985	4	Wauk.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K	3	Russell..... ^D	30-60	...	4	Own	4-8 x 10	GorK	8-10
Avery,SR.Cul.	5-10	...	4	Own	4-3 x 4	G,K	...	Huber Light..... ^I	12-25	985	4	Wauk.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	GorK	3								
Avery, Cult-C	...	...	3	Own	6-3 x 4	G,K	...	Huber Super 4	15-30	...	4	Midw.	4-4 $\frac{1}{2}$ x 6	Gas.	3								
Avery, Cult-C	...	...	4	Own	6-3 x 4	G,K	...																
Avery, Cult-C	...	...	4	Own	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	G,K,D	3-4																
Avery, Cult-C	...	...	4	Own	2-6 $\frac{1}{2}$ x 2 $\frac{1}{2}$	G,K,D	2-3																
Avery, Cult-C	...	...	4	Own	4-4 $\frac{1}{2}$ x 7	G,K,D	3-4																
Avery, Cult-C	...	...	4	Own	4-5 $\frac{1}{2}$ x 6	G,K,D	4-5																
Avery, Cult-C	...	...	4	Own	4-6 $\frac{1}{2}$ x 7	G,K,D	5-6																
Bates All-StD	15-25	...	4	Own	4-4 $\frac{1}{2}$ x 6	Gas.	3	International..... ^A	8-16	...	4	Own	4-4 $\frac{1}{2}$ x 5	G,K,D	2	Shaw-Enochs (Grader)	...	...	2	LeRoi	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	...
Bates Mule..... ^H	15-25	...	4	Midw.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	3	International..... ^B	10-20	...	4	Own	2-6 $\frac{1}{2}$ x 7	Ker.	2-3								
Bates Mule..... ^F	18-25	...	4 $\frac{1}{2}$	Midw.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	3	International..... ^C	15-20	...	4	Own	4-7 x 8	Ker.	3-4								
Bates Mule..... ^G	25-35	...	4 $\frac{1}{2}$	Midw.	4-4 $\frac{1}{2}$ x 6	Gas.	4	Kinkade..... ^A	1 $\frac{1}{2}$ -3	190	1	Own	1-3 x 3	Gas.	...								
Bear..... ^W	...	...	2 $\frac{1}{2}$	Ste.	1-2 $\frac{1}{2}$ x 2 $\frac{1}{2}$	Gas.	4																
Beeman..... ^A	3-4 $\frac{1}{2}$	180	2	B&S	1-2 $\frac{1}{2}$ x 2 $\frac{1}{2}$	Gas.	...																
Beeman..... ^G	4-2	240	4	Own	1-3 $\frac{1}{2}$ x 3 $\frac{1}{2}$	Gas.	...																
Best..... ³⁰	18-30	...	4 $\frac{1}{2}$	Own	4-4 $\frac{1}{2}$ x 6	G,K,D	4	La Crosse..... ^A	6-12	...	4	Own	2-4 x 6	G,K	1	ToroTractor ²²	6-10	675	3	LeR.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	2
Best..... ⁶⁰	35-55	...	4 $\frac{1}{2}$	Own	4-6 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K,D	8-9	La Crosse..... ^B	12-24	...	2	Own	2-6 x 7	G,K</td									

Specifications of Current Passenger Car Models

PRICES										NAME AND MODEL	CARBURETOR	STARTING AND LIGHTING	IGNITION	CLUTCH: TYPE AND MAKE	GEARSET	UNIVERSAL: TYPE AND MAKE	REAR AXLE: TYPE AND MAKE	GEAR RATIOS
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)								
\$1995c	\$1785	\$1850	\$1885c	\$2485	127	33x4 $\frac{1}{2}$	H-S..	6-3 $\frac{1}{2}$ x5	29.40	American.....D-66	G-D.	A-K.	s-p B&B.	B & B	m Hartford.	F Salis. 4.50	
.....	1650	127	33x4	Own.	2-	American.....Steamer	L-N.	L-N.	None	None	Own.	1.75	
1195	1195	1595	1595c	1995c	1995d	1450d	114	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Anderson.....41	Durston.	f Universal.	1 $\frac{1}{2}$ F Salis. 4.62
1495	1495	1595	1595c	1995c	1995d	1450d	120	33x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Anderson.....Series 50	Rayfield.	Remy.	s-p B&B.	Durston.	f Universal.	1 $\frac{1}{2}$ F Salis. 4.62
1785p	1785	2620	2645	3625	3695	130	34x4 $\frac{1}{2}$	Own.	8-3 $\frac{1}{2}$ x5	33.80	Apperson.....8-21-S	Johnson.	Bijur.	Remy.	m-d Own.	Own.	Sterling.	1 $\frac{1}{2}$ F Own. 4.25
1575	1475	1545n	1895n	2275	2345	121	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Auburn.....6-51	Strom.	Remy.	s-p B&B.	G-L.	m Universal.	F Salis. 4.75	
.....	1395	1495d	1850d	1850d	118	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Barley.....	Strom.	Delco.	s-p B&B.	Fuller.	f M&E.	1 $\frac{1}{2}$ F Col. 4.58	
865	885	725g	1175	1395	109	31x4	Own.	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	18.23	Buick.....1923-34-5-6-7-38	Rayfield.	Delco.	m-d Own.	Own.	m Own.	1 $\frac{1}{2}$ F Own. 4.66	
1175	1195	975g	1935	1985	118	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Buick.....1923-41-4-5-47	Strom.	Delco.	m-d Own.	Own.	m Own.	F Own. 4.40		
.....	1435	1675c	1895	2195	124	34x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Buick.....1923-48-9-50-45-55	Rayfield.	Delco.	m-d Own.	Own.	m Own.	F Own. 4.40		
2885	2885	2885	3675	3050	132	33x5	Own.	8-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	31.25	Cadillac.....61	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim. Opt
1750b	1790	2480	2575	122	32x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Case.....X	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Snead.	1 $\frac{1}{2}$ F Col. 4.66		
1185	1185	1990	2480c	2975b	129	34x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	31.54	Case.....W	Rayfield.	Delco.	m-d Own.	Own.	f Arvac.	1 $\frac{1}{2}$ F Col. 4.45		
1495	1495	1595	2295	117	32x4	Own.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	25.35	Chalmers.....1922	Strom.	A-L.	Remy.	m-d Own.	Own.	m Hardy.	1 $\frac{1}{2}$ F Adams. 5.13		
1495	1495c	1645	1950c	2295d	123	33x4	Own.	6-3 $\frac{1}{2}$ x5	29.40	Chandler.....Six	Rayfield.	Bosch.	s-p B&B.	Own.	f Own.	F Own. 4.45		
510	525	425g	840c	860	103	30x3 $\frac{1}{2}$	Own.	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	21.76	Chevrolet.....Superior	Zenith.	Remy.	s-p B&B.	Own.	m Own.	1 $\frac{1}{2}$ F Own. 3.77	
1085b	995	1059d	1260d	1485d	112 $\frac{1}{2}$	31x4	Own.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	22.50	Cleveland.....42	Strom.	Bosch.	Delco.	m-d North.	Own.	m Spicer.	1 $\frac{1}{2}$ F Col. 4.70	
2685	2685	2685	3285b	3285c	127 $\frac{1}{2}$	33x5	Cont.	8-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	39.20	Cole.....890	Johnson.	Delco.	Delco.	m-d North.	Own.	m Own.	1 $\frac{1}{2}$ F Tim. Opt	
.....	1475	1995c	1995d	115	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Columbia.....Big Six	Strom.	A-L.	A-K.	s-p B&B.	Durston.	m Spicer.	1 $\frac{1}{2}$ F Tim. 4.75	
995	985	1095d	1395c	1235a	1395d	115	31x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Columbia.....Light Six	Strom.	A-L.	A-L.	s-p B&B.	Durston.	m Spicer.	1 $\frac{1}{2}$ F Tim. 4.80
1295	1395	1495c	1965c	2165d	116	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Courier.....	Strom.	West.	West.	s-p B&B.	Muncie.	f Flexite.	1 $\frac{1}{2}$ F Col. 5.00	
.....	3500	3500	4500	4500	138	33x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	31.54	Crawford.....23-6-60	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	1 $\frac{1}{2}$ F Tim. 4.16	
.....	3500c	3500c	4250c	4250c	138	33x5	Cont.	6-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	31.54	Crawford-Dagmar.....6-70	Zenith.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.	1 $\frac{1}{2}$ F Tim. 4.23	
.....	.....	.....	.....	.....	142	33x5	Own.	8-3 $\frac{1}{2}$ x5	45.00	Cunningham.....V	Strom.	Delco.	m-d Own.	Own.	f Snead.	F Tim. 4.23
4350b	4350c	4350	4350c	6000	132	33x5	Own.	8-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	39.20	Daniels.....23-38	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	F Tim. 4.23	
1485b	1295	1495c	1795c	1795d	115	31x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Davis.....71	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Peters.	1 $\frac{1}{2}$ F Tim. 5.10	
1595	1595	1695	2095	120	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.34	Davis.....63-65	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Peters.	1 $\frac{1}{2}$ F Tim. 5.15		
1175	1175	1295c	1245	1545	112	32x4	H-S..	4-3 $\frac{1}{2}$ x5	19.60	Dixie Flyer.....H-S-70	Strom.	Dyneto.	Eisemann.	s-p B&B.	G-L.	f Hardy.	1 $\frac{1}{2}$ F Tim. 4.16	
850	880	980	980	1195d	114	32x4	Own.	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	24.03	Dodge Brothers.....	Strom.	N.E.	Conn.	m-d Own.	Own.	m Own.	1 $\frac{1}{2}$ F Tim. 4.23	
.....	3950c	3950	4150c	4150c	132	33x5	Own.	6-4 x5	38.40	Doris.....6-80	Strom.	West.	Bosch.	m-d Own.	Warner.	m Spicer.	1 $\frac{1}{2}$ F Flint. 4.66	
865	865	1015a	1240	1370	108	31x4	D-Ly.	4-3 $\frac{1}{2}$ x5	19.60	Dort.....19-14	Carter.	Bosch.	m-d Dettaff.	Own.	m Mech.	1 $\frac{1}{2}$ F Flint. 4.66		
900	900	1145	1195	115	31x4	Falls.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Dort.....25-20	Carter.	Bosch.	Bosch.	m-d Dettaff.	Own.	m Mech.	1 $\frac{1}{2}$ F Flint. 4.66		
6500	7800c	7800c	134	33x5	Own.	8-2 $\frac{1}{2}$ x5	26.45	Duesenberg.....Straight 8	Strom.	Delco.	Delco.	s-p B&B.	Own.	f Climax.	1 $\frac{1}{2}$ F Own. 4.45			
890	890	1365	1365	109	31x4	Cont.	4-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	24.03	Durant.....A-22	Till.	A-L.	A-L.	s-p B&B.	Warner.	m Spicer.	1 $\frac{1}{2}$ F Adams. 4.33		
1600	1650	2250	2400	123 $\frac{1}{2}$	32x4 $\frac{1}{2}$	Anst.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	25.35	Durant.....B-22	Rayfield.	A-L.	A-L.	s-p Ansted.	Warner.	m Spicer.	1 $\frac{1}{2}$ F Tim. 5.15		
1485	1095	1795c	1795d	112	32x4	Own.	4-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	18.91	Earl.....40	Sooe.	A-L.	Conn.	s-p B&B.	Own.	f Own.	1 $\frac{1}{2}$ F Own. 4.87		
965	965	1165d	1425d	112	31x4	Lyc.	4-3 $\frac{1}{2}$ x5	19.60	Earl.....4-40	Strom.	Delco.	Delco.	s-p B&B.	Muncie.	m Peters.	1 $\frac{1}{2}$ F Salis. 4.50		
1395	1395	1395	1975	2065	109	33x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.31	Earl.....5-R	Strom.	Delco.	Delco.	m-d Warner.	Warner.	m Spicer.	1 $\frac{1}{2}$ F Salis. 4.50	
1125c	1125	1165	1616	118	33x4	Falls.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	23.44	Elgin.....K-1	Strom.	West.	Wagner.	s-p B&B.	Mech.	m Mech.	1 $\frac{1}{2}$ F Col. 4.66		
1045	1045	1145	1245k	108 $\frac{1}{2}$	32x4	Own.	4-3 $\frac{1}{2}$ x5	18.23	Essex.....	Strom.	Bosch.	m-d Own.	Own.	m Spicer.	1 $\frac{1}{2}$ F Own. 4.66			
269r	298s	235g	530	100	30x3 $\frac{1}{2}$	Own.	4-3 $\frac{1}{2}$ x4	22.50	Ford.....T	Own.	Own.	Own.	m-d Own.	Own.	m Own.	1 $\frac{1}{2}$ F Own. 3.63	
3900	3900	4900	4900d	132	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x5	27.34	Fox.....7F	Zenith.	West.	Scintilla.	m-d B-L.	B-L.	m Spicer.	1 $\frac{1}{2}$ F Tim. 4.90		
1900	1950	2750c	2850d	115	32x4	Own.	6-3 $\frac{1}{2}$ x4	25.35	Franklin.....10	N.E.	A-K.	A-K.	s-p B&B.	Own.	m Spicer.	1 $\frac{1}{2}$ F Own. 4.73		
965	965	1115k	1365d	112	32x4	Lyc.	4-3 $\frac{1}{2}$ x5	21.76	Gardner.....T-R & G	Carter.	West.	West.	s-p B&B.	Mech.	m Mech.	1 $\frac{1}{2}$ F Flint. 4.80		
490	490	760d	760d	100	30x3 $\frac{1}{2}$	Own.	4-3 $\frac{1}{2}$ x4	21.03	Gray.....Gray	Carter.	West.	West.	m-d Own.	Own.	m Mech.	1 $\frac{1}{2}$ F Tim. 3.90		
2475	2475c	3450	3450	120	32x4 $\frac{1}{2}$	Weid.	4-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	22.50	H.C.S. ....Series 4	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer.	1 $\frac{1}{2}$ F Own. 4.66		
1595	1595	1695c	2475c	121	32x4	Cont.	6-3 $\frac{1}{2}$ x4 $\frac{1}{2}$	27.23	Handley-Knight.....	Till.	Delco.	Delco.	m-d Warner.	Warner.	m Peters.	1 $\frac{1}{2}$ F Tim. 4.66		
1345	1345	1345c	1950	115	32x4	H-S..	4-3 $\frac{1}{2}$ x5	19.60	Hanson.....66	Strom.	Delco.	Delco.	s-p B&B.	G-L.	m Universal.	1 $\frac{1}{2}$ F Tim. 4.66		
2395	2395	3095	3395f	132	33x5	Own.	6-3 $\frac{1}{2}$ x5 $\frac{1}{2}$	29.40	Hatfield.....A-42	Zenith.	Dyneto.	Conn.	s-p B&B.	G-L.	m Spicer.	1 $\frac{1}{2}$ F Col. 4.66		
1895p	1895p	2395p	2395p	121	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x5	29.40	Haynes.....75	Strom.	King.	King.	s-p Warner.	Own.	m Universal.	1 $\frac{1}{2}$ F Own. 4.66		
1895p</																		



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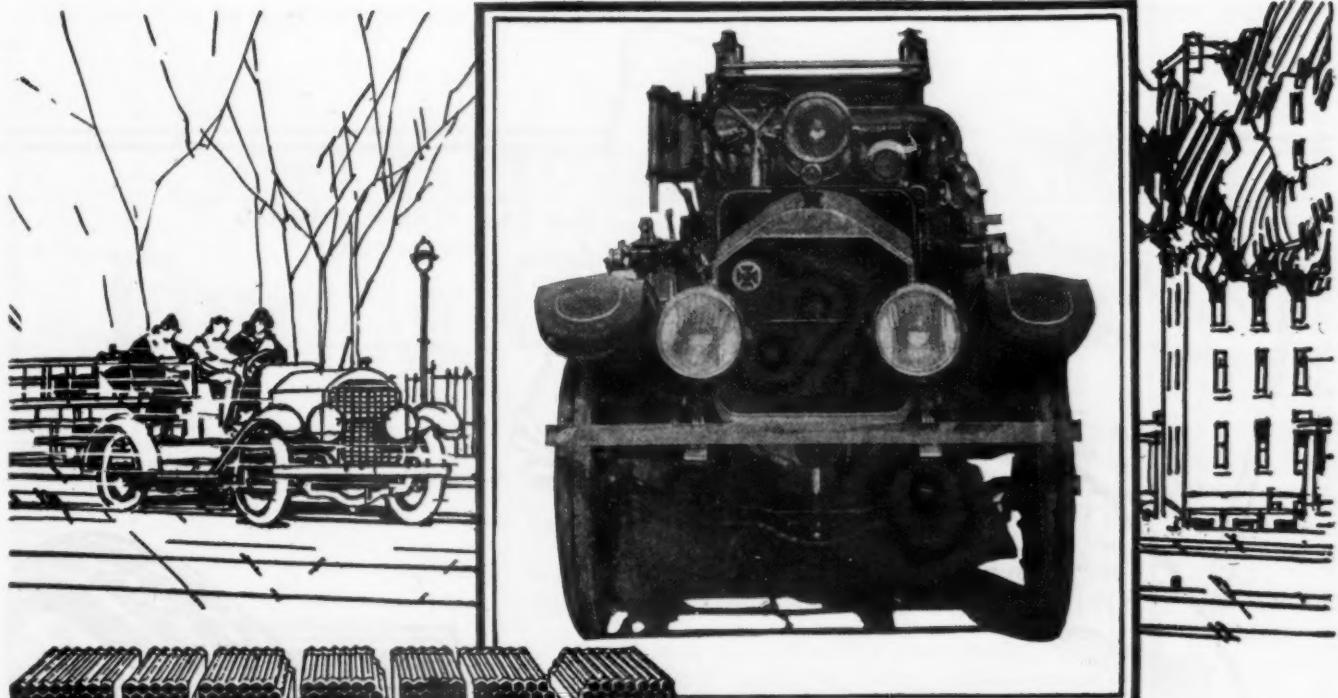
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Specifications of Current Passenger Car Models

PRICES										NAME AND MODEL	Carburator	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	Gear Ratios		
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)										
\$3985	\$4090	\$4090		\$5500	\$5500	132	33x5	Own.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	33.80	LaFayette	Delco	m-d Own.	Own.	F Own.	1.58				
1695	1695	1795	\$2045d	2345c	255d	123	32x4 $\frac{1}{2}$	Anst.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	25.35	Lexington	Rayfield	m-d Ansted.	Warner.	$\frac{1}{2}$ F Own.	5.10				
1575	1395	1575	2085	2245	117	32x4	Own.	6-3 $\frac{1}{2}$ x 5	23.44	Liberty	10-D	Strom.	Wagner.	s-p B&B.	Detroit.	m Spicer.	$\frac{1}{2}$ F Tim.	4.80		
3800	3800c	3800	4400d	4700d	136	33x5	Own.	8-3 $\frac{1}{2}$ x 5	36.45	Lincoln	Strom.	Delco	m-d Own.	Own.	F Tim.	4.58				
6890	7600c	7600	10500	11000	142	35x5	Own.	6-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	48.60	Locomobile	Series 8	Ball&B.	West.	m-d Own.	Own.	F Own.	3.50			
3385	3185c	3185	3985	4385	136	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	33.75	Marmon	34	Strom.	Delco	m-d Own.	Own.	$\frac{1}{2}$ F Own.	3.75			
885	885	1995	1335	109	31x4	Own.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	21.03	Maxwell	Stewart	A-L.	Simms.	s Own.	Own.	$\frac{1}{2}$ F Own.	1.56				
6300	6300c	6300	7500	7500	140	33x5	Own.	6-4 $\frac{1}{2}$ x 6	48.60	McFarlan	1922	Rayfield	West.	s-p B&B.	B-L.	m Peters.	F Tim.	3.50		
3950	3950c	3950c	4850	5250	132	32x4 $\frac{1}{2}$	Own.	4-3 $\frac{1}{2}$ x 6 $\frac{1}{2}$	22.50	Mercer	Series 5	Ball&B.	West.	m-d Own.	Own.	F Own.	3.57			
3750	3750	5000	5000	5000	132	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5	33.75	Mercer	6	Strom.	Eisemann.	m-d Own.	Own.	$\frac{1}{2}$ F	3.77			
1895	1895				119	32x4	Cont.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	25.35	Merit	Strom.	Delco	s-p B&B.	Muncie.	f Snead.	F Col.	4.60			
1490b	1590		1850c	2050c	120	32x4	Own.	6-3 $\frac{1}{2}$ x 5	29.40	Mitchell	F-50	Strom.	Remy.	s-p B&B.	Own.	F Own.	4.42			
	1690				127	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5	29.40	Mitchell	F-50	Strom.	Remy.	s-p B&B.	Own.	F Own.	4.42			
950	950		1445	1585c	115	32x4	Own.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	16.90	Monroe	1922-S-9	Zenith.	A-h.	m-d Own.	Mech.	$\frac{1}{2}$ F Own.	5.30			
1295			1895p	2085p	128	33x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	23.44	Moon	6-40	Strom.	Delco	s-p B&B.	Warner.	$\frac{1}{2}$ F Tim.	4.80			
	1785		1995	2585	2485p	128	33x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	27.34	Moon	6-58	Strom.	Delco	B&B.	B-L.	$\frac{1}{2}$ F Tim.	5.00		
1210	1240	1395c	2040d	121	33x4	Own.	6-3 $\frac{1}{2}$ x 5	25.35	Nash	601-96-97	Marvel	Delco	s-p B&B.	Own.	m Own.	$\frac{1}{2}$ F Own.	4.50			
915	935	1390	1645	1890c	127	34x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5	25.35	Nash	602-94-95	Marvel	Delco	s-p B&B.	Own.	$\frac{1}{2}$ F Own.	4.50			
				1385b	1545d	112	33x4	Own.	4-3 $\frac{1}{2}$ x 5	18.23	Nash Four	41-4	Schebler	Delco	s-p B&B.	Own.	$\frac{1}{2}$ F Own.	4.88		
2475b	2475c	2375	3250c	3825p	130	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	29.40	National	BB	Rayfield	West.	s-p B&B.	B-L.	m Arvac.	F Col.	4.08		
2500	2500	2600c	3500d	128	32x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	25.35	Noema	3C	Claudel.	Delco	s-p B&B.	Detroit.	m Spicer.	$\frac{1}{2}$ F Tim.	4.45			
2500	2500		5500	128	33x5	Bea.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	29.40	Noema	1D	Zenith.	Delco	s-p B&B.	Detroit.	f Spicer.	$\frac{1}{2}$ F Tim.	4.45			
975	995	795	1165c	1445d	115	32x4	Own.	6-2 $\frac{1}{2}$ x 4 $\frac{1}{2}$	18.99	Oakland	6-44	Marvel	Remy.	s Own.	Muncie.	m Mech.	F Own.	4.33		
3750c	3750	3850	3750c	4500c	4800p	134	33x5	Cont.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	31.54	Ogren	6 T D Lure	Rayfield	Bosch.	m-d B-L.	m	F Col.	1.00		
955	975	1350d	1075	1475	1595	115	32x4	Own.	4-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	21.86	Oldsmobile	43 A	Zenith.	A-L.	s-p B&B.	Warner.	m Own.	$\frac{1}{2}$ F Own.	4.33	
1735c	1850c	1735	1995	2245	122	32x4 $\frac{1}{2}$	Own.	6-2 $\frac{1}{2}$ x 5 $\frac{1}{2}$	26.45	Oldsmobile	46	Ball&B.	Delco	s-p B-L.	Warner.	m Own.	$\frac{1}{2}$ F Own.	4.93		
1625p	1375		1675	1875	2025	115	32x4	Own.	6-2 $\frac{1}{2}$ x 5 $\frac{1}{2}$	26.45	Oldsmobile	47	Johnson	Delco	s-p B&B.	Warner.	m Spicer.	$\frac{1}{2}$ F Own.	5.10	
525	525		425p	795	875	100	30x3 $\frac{1}{2}$	Own.	4-3 $\frac{1}{2}$ x 4	18.23	Overland	4	Till.	A-L.	s-p B&B.	Own.	$\frac{1}{2}$ F Own.	4.50		
2485	2485	2250g	3175	3275	126	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5	27.34	Packard	Single-Six	Own.	A-K.	Delco	m-d Own.	Own.	f Spicer.	1 $\frac{1}{2}$ F Own.	4.30	
			2350g	2685	3525	133	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5	27.34	Packard	Single-Six	Own.	A-K.	Delco	m-d Own.	Own.	f Spicer.	1 $\frac{1}{2}$ F Own.	4.66
3850	3850	3850	5240	5400	136	35x5	Own.	12-3 $\frac{1}{2}$ x 5	43.20	Packard	Twin-Six	Own.	Bijur.	Delco	m-d Own.	Own.	m Spicer.	1 $\frac{1}{2}$ F Own.	4.36	
1465	1465	1290c	1995	2245	119	32x4	Own.	6-3 $\frac{1}{2}$ x 5	25.35	Paige	6-44	Strom.	Remy.	A-K.	s-p Long.	Own.	m Universal.	1 $\frac{1}{2}$ F Salis.	4.75	
2495b	2195	2245	3100	3155	131	32x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 5	33.75	Paige	6-66	Rayfield	Remy.	A-K.	s-p Long.	Warner.	m Meen.	1 $\frac{1}{2}$ F Tim.	4.60	
	1390	1425	2295	2395	120	32x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	27.34	Paterson	22-6-52	Strom.	Delco	s-p B&B.	Durston.	m Hartford.	$\frac{1}{2}$ F Std.	4.50		
3300	2990c	2990	3300a	3990d	128	33x5	Own.	6-3 $\frac{1}{2}$ x 5	33.80	Peerless	23	Ball&B.	Delco	m-d Own.	Own.	m Spicer.	$\frac{1}{2}$ F Tim.	4.90		
5250	5250c	5250	6800	6900	138	33x5	Own.	6-4 x 5 $\frac{1}{2}$	38.40	Pierce-Arrow		Own.	Delco	m-d Own.	Own.	m Spicer.	$\frac{1}{2}$ F Own.	3.93		
2050	2000	2050	2950	3000	126	32x1 $\frac{1}{2}$	H-S.	6-3 $\frac{1}{2}$ x 5	25.35	Pilot	6-50	Till.	Bijur.	Conn.	s-p B&B.	Muncie.	m Hartford.	$\frac{1}{2}$ F Col.	4.33	
3150	3100c	3250	4300	5100	126 $\frac{1}{2}$	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	27.34	Premecar	6-40-A	Strom.	Wagner.	s-p B&B.	Mech.	m Spicer.	$\frac{1}{2}$ F Own.	4.66		
1095	1095		1750	1825	117	32x4	Falls.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	23.44	R & V Knight	R	Strom.	Wagner.	s-p B&B.	B-L.	m Spicer.	F Salis.	4.75		
2475	2475c	2475	3015	3105	127	32x4 $\frac{1}{2}$	Own.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	20.40	R & V Knight	J	Strom.	Wagner.	s-p B&B.	B-L.	m Spicer.	1 $\frac{1}{2}$ F Tim.	4.90		
	1645	1485	1745	2355c	2435	120	32x4	Own.	6-3 $\frac{1}{2}$ x 5	24.34	Reo	T6 & U6	Rayfield.	N.E.	m-d Own.	Own.	m f Own.	$\frac{1}{2}$ F Own.	4.70	
3200	3200	3200	4000	4131	131	32x4 $\frac{1}{2}$	Dues.	4-4 $\frac{1}{2}$ x 6	28.90	Revere	C	Strom.	West.	Bosch.	m-d B-L.	m Spicer.	$\frac{1}{2}$ F Std.	4.00		
1485	1485	1885	1985	117	32x4	Own.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	23.44	Rickenbacker	A	Strom.	Simms.	A-K.	s Own.	m Universal.	1 $\frac{1}{2}$ F Own.	4.88			
2685	2685c	3585	3585	3585	128	32x4 $\frac{1}{2}$	Cont.	6-3 $\frac{1}{2}$ x 5 $\frac{1}{2}$	20.40	Roamer	6-54-E	Strom.	Bijur.	s-p G-L.	G-L.	f Sned.	$\frac{1}{2}$ F Tim.	3.77		
3785	3435	3650c	3650c	4650c	128	32x4 $\frac{1}{2}$	Dues.	4-4 $\frac{1}{2}$ x 6	28.90	Roamer	4-75-E	Strom.	Bijur.	s-p B-L.	B-L.	f Sned.	$\frac{1}{2}$ F Tim.	3.25		
10900	10900	10950	12900	13150	143 $\frac{1}{2}$	35x5	Own.	6-4 $\frac{1}{2}$ x 4 $\frac{1}{2}$	48.60	Rolls-Royce		Strom.	Bijur.	s-p B-L.	B-L.	m Own.	F Own.	4.00		
1615	1645		2645	118	33x4	Cont.	6-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	25.35	Sayers Six	DP	Strom.	Delco	s-p B&B.	G-L.	m Arvac.	$\frac{1}{2}$ F Std.	4.75			
875	875		108	303 $\frac{1}{2}$	164	31x4	Lye.	4-3 $\frac{1}{2}$ x 5	19.60	Seneca	L-2 & O-2	Zenith.	A-L.	s-p B&B.	G-L.	m Universal.	F	4.75		
985	985		112	31x4	164	31x4	Lye.	4-3 $\frac{1}{2}$ x 5	19.60	Seneca	50 & 51	Zenith.	A-L.	s-p B&B.	G-L.	Detroit.	F	4.50		
2150	2395	2395	2750	3200	127	34x4 $\frac{1}{2}$	Own.	8-3 $\frac{1}{2}$ x 5	33.80	Standard	98	Zenith.	West.	Splitdorf						



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These water passages are .0900" at their narrowest point — 36% wider than those in the average cellular core. At curves they are .40" wide.

There are 36 water passages to every foot width of core.

Repairmen and Garage Owners all over the country are Doing a Mighty Profitable and Satisfactory Business Replacing Broken or Worn Out Radiators with these New Fedders Cores. Write us At Once for Details.

FEDDERS MANUFACTURING COMPANY, Inc.

Factory and General Offices
BUFFALO, N. Y.

Canadian Factory: Bridgeburg, Ontario

Branches and Distributing Agencies:

CLEVELAND
Fedders Mfg. Co., Inc.
3610 Superior Ave., N. E.

INDIANAPOLIS
Seth Klein Radiator Service Co.
820 North Meridian St.

NEW YORK
Henry Jeilinck Co., Inc.
364-366 W. 50th St.

DETROIT
Olympian Radiator Repair Co.
218 W. Adams Ave.

BALTIMORE
Enterprise Auto Radiator Wks.
1908-1912 Frederick Avenue

SAN FRANCISCO, CALIF.
Feldmans Auto Metal Works
76 Eighth St.

GENERAL TIRE & RUBBER

Contract Let for Three Additions to Factory—Orders
Keep on Increasing

Akron—General Tire & Rubber Co. has let contracts for three additions to its factory which, with additions to equipment in the present plant, will double capacity. Contract calls for completion of additions by the first of the year. Orders continue to increase. In October, usually the lowest month in the year, the company ran behind in deliveries.

—from the
WALL STREET JOURNAL
October 31, 1922

Will you
double your
sales with us
in 1923?



—goes a long way
to make friends

THE
GENERAL
CORD TIRE



THE GENERAL TIRE AND RUBBER COMPANY

AKRON, OHIO, U. S. A.

See Ruggles Trucks During Chicago Show

The regular annual exhibit of Ruggles Trucks will be held in the Hotel Sherman lobby, Chicago, January 27 to February 3.

While you are attending the big automotive show, take time to see this truck exhibit.

Examine the chassis. See, point by point, why the Ruggles is the most efficient and most economical business truck. See the selection of bodies—a Ruggles Truck for every business.

You will understand why we were able to build a nation-wide dealer organization in a comparatively short time. You will know why Ruggles dealers established an unusual sales record during the past year.

All signs point to *big truck business in 1923*. You naturally want some of this prosperity. The first step is to represent the right truck and be connected with a go-getter organization.

We *know* we have the truck and we *believe* we have the organization. You can prove both points if you'll visit us at the Hotel Sherman.

*Dealers not attending the Chicago Show,
write for the 1923 Ruggles Selling Data*

RUGGLES MOTOR TRUCK COMPANY
Saginaw, Michigan

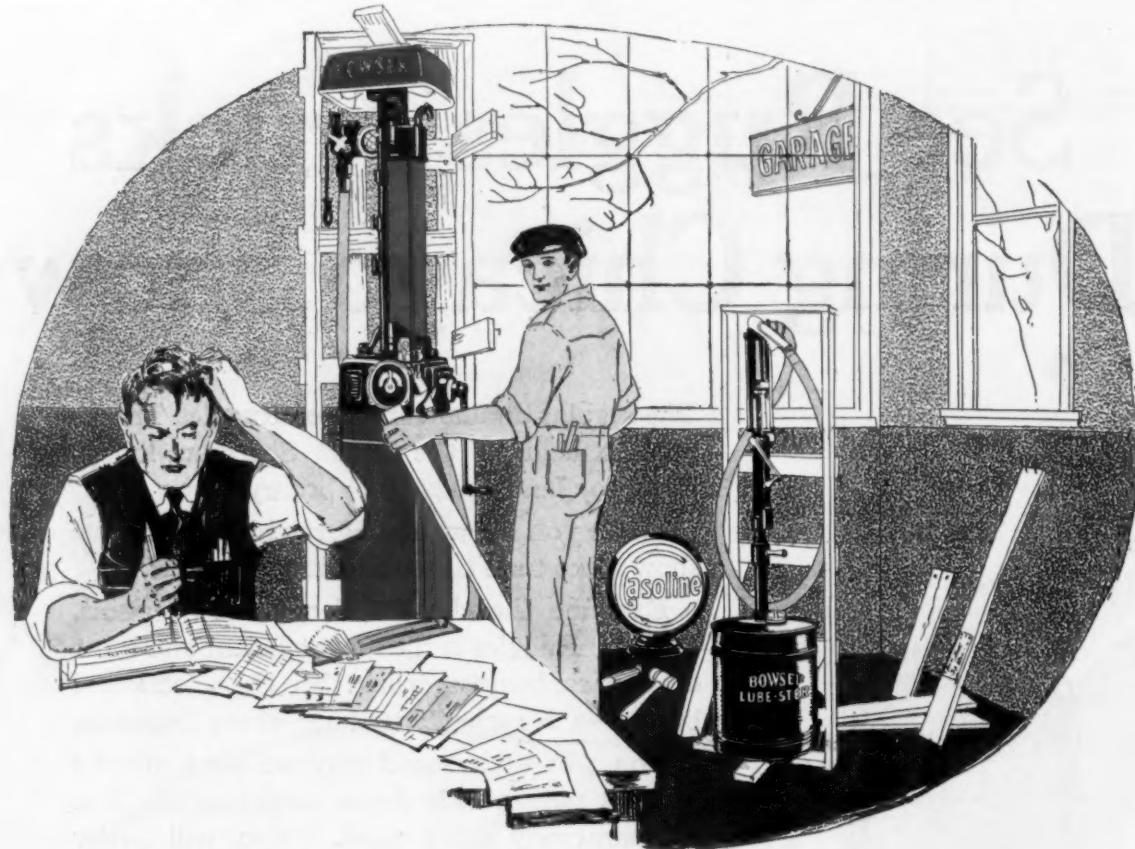
Canadian Factory:
Ruggles Motor Truck Co., Ltd., London, Ontario



**On Display
Hotel Sherman
January 27
to
February 3**

RUGGLES

The World's Greatest Truck Value



The Proud Moment

When you uncrate the new Bowser Pump, you know there will be no more worry over gasoline profits. That's why there are more Bowsers uncrated each year than any other gasoline pump made.

Write today for "New Stuff" and Folder A14, the little folder on "How to Sell Him Oil Too," will be sent without charge or obligation.

S. F. BOWSER & COMPANY, Inc.

Pump and Tank Headquarters

Home Plant: Fort Wayne, Indiana

Canadian Plant: Toronto, Ontario

*Factories and Warehouses: Albany, Dallas, Milwaukee, San Francisco, Sydney
Branch Offices, with Service Departments, in Principal Cities in this Country and Abroad. Representatives Everywhere.*

BOWSER
ESTABLISHED 1885
ACCURATE MEASURING PUMPS

BOWSER PRODUCTS for Handling Gasoline and Oils Wherever Sold or Used

Filling Station Pumps and
Tanks for Gasoline.

Storage and Measuring Out-
fits for Paint Oils, Kero-

sene and Lubricating Oils.

Portable Tanks for Gasoline

and Oil.

Power Pumps.

Dry Cleaners' Underground

Naptha Clarifying Systems.

Carload Oil Storage Tanks.

Richardson-Phenix Oil Cir-
culating and Filtering
Systems and Force Feed
Lubricators.

GARCO ASBESTOS BRAKE LINING

SOLIDLY woven
with more asbestos
to give it perman-
ency. GARCO is
all brake lining,
through and
through.

General Asbestos &
Rubber Co.

Main Offices and Factories:
Charleston, S. C.

Branches:
New York: 206 Broadway
Chicago: 14 North Franklin St.
Pittsburgh: 311 Water Street



*America's leading manufacturers
of asbestos textile products*



During 1922 Rickenbacker dealers made money—good money. During 1923 they'll make more money!

First, because of the refined new Rickenbacker series. *But in addition—*

Well—before we give you all the facts, wire us to show your interest.

Touring Phaeton—\$1485; Coupe—\$1885; Sedan—\$1985;
f. o. b. Detroit.

Rickenbacker Motor Company
Detroit Michigan

Rickenbacker
A • CAR • WORTHY • OF • ITS • NAME

Front AXLES and **TIMKEN** *Tapered* **ROLLER BEARINGS**

The overwhelming dominance of Timken Tapered Roller Bearings in front wheel mountings is conclusive evidence of the correctness of Timken design and construction.

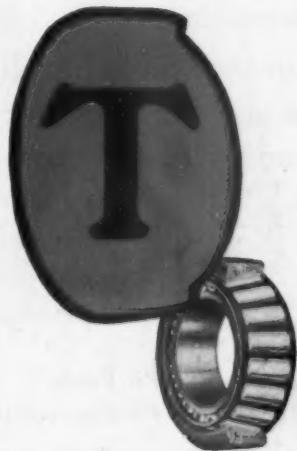
Specifically Timken design means

the ability to carry all loads—radial loads, thrust loads, and resultant loads—continuously and simultaneously at required speeds—

the capacity to carry more load, size for size, than any other type of bearing—

the possibility of being easily and quickly adjusted when the wear which *must* follow motion does occur, and made to function as when new.

Timken Bearings mean light, simple, compact hubs—an initial saving both to maker and user; and snug, true running, nice-steering front wheels—a final saving and a great comfort to the user in particular.





"He Wanted the Best, Regardless"

—So I Put in American Hammered

American Hammered Piston Rings



"That's one of my regular customers and he gets the best I've got. When it comes to piston rings, that means American Hammered. He'll have no more piston ring trouble.

"I've had a big turnover on those rings and I've never had a kick. They are leakless when I put them in and they stay leakless.

"It certainly is a regular line to handle. If I don't happen to have the size ring I want, it's easy to get it quickly. Leading distributors in all parts of the country stock American Hammered Piston Rings because the public wants 'em."

Ask your jobber.

Factory
List Prices **60c**

Up to 4 $\frac{1}{2}$ inches

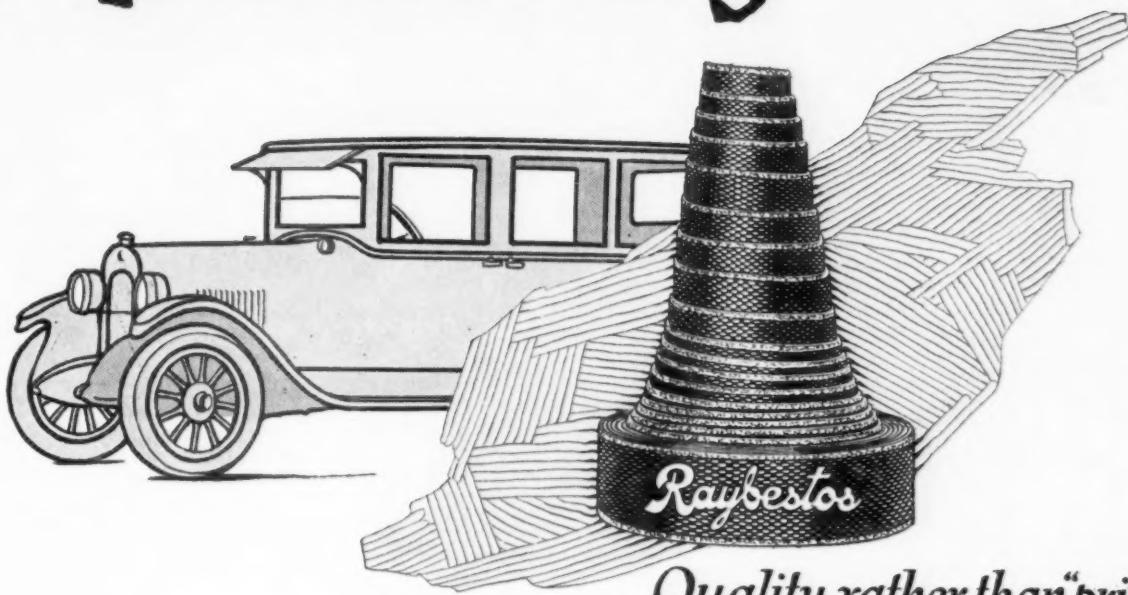
To Fit Fords
To Fit Chevrolets **50c**

No extra charge for oversizes

AMERICAN HAMMERED PISTON RING COMPANY
BALTIMORE, MARYLAND

Export Department, 461 Eighth Ave., New York, U. S. A.

leadership involves responsibility —



Quality rather than "price"



Those of you who are veterans in the business will remember that in the early days, Raybestos was the dominant factor in the brake lining industry. If an owner wanted brakes relined, he naturally asked for Raybestos. You will recall also that as automobiles multiplied, so grew the demand for Raybestos. The name became a synonym for brake lining.

Leadership brought with it the added responsibility of sustaining reputation. The cheaper lining is not required to guard its name with the same zealous care.

To deviate one iota from formula, treatment, material and inspection—which contribute so much to the Raybestos reputation—is to avoid responsibility which reputation creates and forfeit our most valuable business asset—

Silver Edge **Raybestos leadership**

THE RAYBESTOS COMPANY

Factories: BRIDGEPORT, CONN. PETERBOROUGH, ONT., CANADA

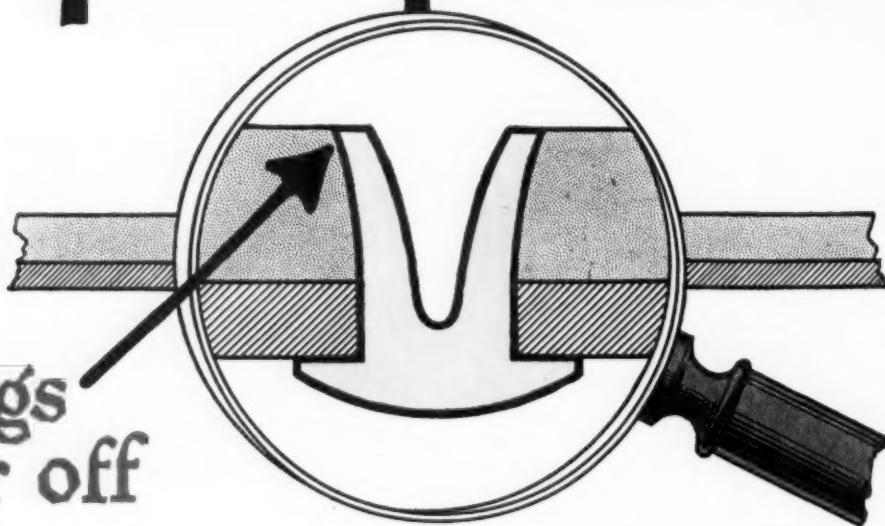
Branches: Detroit, 2631 Woodward Ave.
Chicago, 1603 South Michigan Ave.

San Francisco, 835 Post St.
Washington, D. C., 107 Columbia Bldg.



Split rivets and split profits -

prongs
wear off

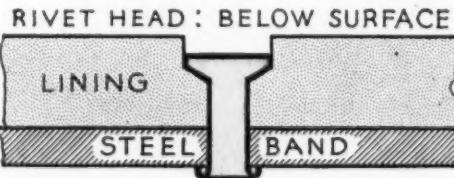


Some service men are using split rivets for attaching lining to brake bands, because it is the *easiest* way rather than the best way. If the split rivet method were right, prominent axle manufacturers and automobile builders would use split rivets—but, they don't. They cannot afford to jeopardize name and reputation by using split rivets.

The reputable service man who takes pride in his work *does not* use split rivets, nor cheap brake lining. He is a good mechanic and knows that if he uses split rivets, his customer will get split service. He realizes that successful business cannot be built on any "split idea."

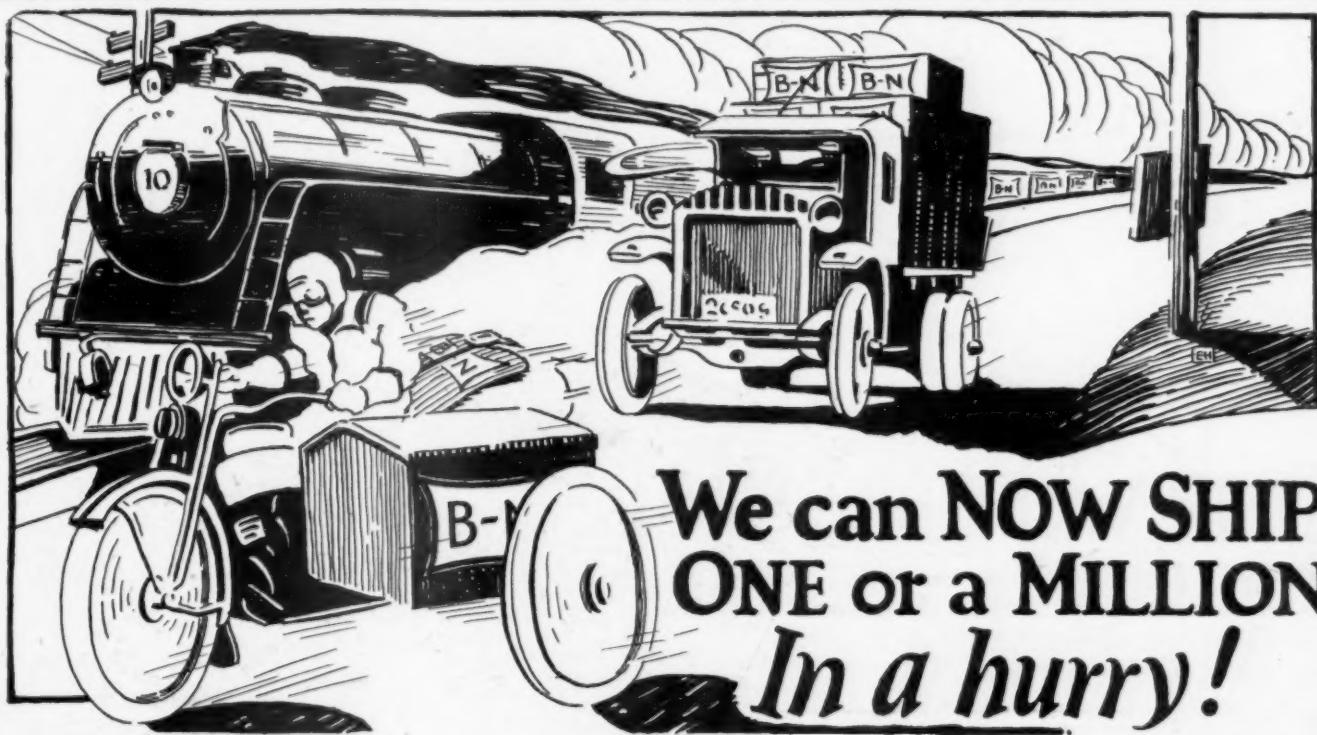
There is one efficient method for attaching lining to brake drums—drilling, countersinking and riveting (with tubular or solid rivets) the head of the rivet about $\frac{1}{32}$ of an inch below the surface of the lining, using a flat head rivet that WILL NOT SPLIT THE LINING and will hold until the lining is worn to *half its original thickness*. As brake specialists—brake experts—we advise that brake lining be attached only in this manner. Raybestos installation must be as good as Raybestos itself.

Profits that come easy seldom last. Profits built on value received are cumulative profits that go on and on. It may require more time and possibly more labor to put brake lining on in the right way, but there is always the satisfaction of a good job well done and increased patronage which follows reliable service.



Do the job the right way
- the *Silver Edge* *Raybestos* way

Are you watching our National advertising?



We can NOW SHIP ONE or a MILLION *In a hurry!*

BIG stocks at our warehouse and in your jobber's hands enable us to now guarantee immediate shipment on any sized order. Place yours now for "at once" or "future" delivery.

List of Jobbers

Atlanta, Ga.	Alexander-Seewald Co.
Bakersfield, Cal.	Auto Parts Service Co.
Baltimore, Md.	Baltimore Gas Light Co.
Baltimore, Md.	National Service Co.
Boston, Mass.	Unit Parts Co.
Bridgeport, Conn.	J. H. Cohen Co.
Brooklyn, N. Y.	E. Kreiger & Son
Buffalo, N. Y.	United Parts Co.
Calgary, Alta., Can.	Motor Car Sup. Co., Ltd.
Charleston, S. C.	C. D. Franke & Co., Inc.
Chicago, Ill.	Auto Replacement Parts Co.
Cleveland, Ohio.	Cooler Auto Parts Co.
Davenport, Iowa.	Sieg Co.
Dayton, Ohio.	G. W. Shroyer & Co.
Dubuque, Iowa.	Midwest Auto Supply Co.
Duluth, Minn.	Motor Equipment Co.
Evansville, Ind.	Lannert Mfg. Co.
Ft. Wayne, Ind.	Ft. Wayne Iron Store Co.
Hartford, Conn.	L. L. Eneworth & Son.
Joplin, Mo.	Joplin Supply Co.
Kansas City, Mo.	Harbison Mfg. Co.
Knoxville, Tenn.	C. M. McClung & Co.
Liberia, Kas.	Motor Parts & Supply Co.
Little Rock, Ark.	Voss-Hutton Mfg. Co.
Los Angeles, Cal.	Weinstock-Nichols Co.
Louisville, Ky.	Peaslee-Gaulebert Co.
Lynchburg, Va.	Barker-Jennings Hardware Co.
Marion, Ohio.	Lawrence Auto Supply Co.
Milwaukee, Wis.	Shadbold & Boyd Iron Co.
Montgomery, Ala.	Loch Hardware Co.
Nashville, Tenn.	Automobile Bearings Co.
Newark, N. J.	Economy Auto Supply Co.
New Haven, Conn.	C. S. Merick & Co.
New Orleans, La.	Oliver H. Van Horn, Inc.
New York, N. Y.	C. H. Fraze
Oklahoma City, Okla.	Sharp Auto Supply Co.
Oakland, Calif.	Weinstock-Nichols Co.
Peoria, Ill.	Weinstock-Nichols Co.
Philadelphia, Pa.	Cummings and Emerson
Pittsburgh, Pa.	H. P. Schade Co., Inc.
Pittsburgh, Pa.	Dyke Motor Supply Co.
Providence, R. I.	Replacement Auto Parts Co.
Richmond, Va.	W. E. Davis & Co.
San Francisco, Cal.	Walte Auto Supply Co.
San Francisco, Cal.	Benj. T. Crump Co., Inc.
Spartanburg, S. C.	Bryce Howatson
St. Joseph, Mo.	Weinstock-Nichols Co.
St. Louis, Mo.	Spartan Hardware Co.
Syracuse, N. Y.	Stewart Hardware & Mfg. Co.
Tampa, Fla.	Onondaga Auto Supply Co.
Toledo, Ohio.	Wholesale Auto Supply Co.
Waco, Texas.	Roberts-Toledo Auto Co.
Washington, D. C.	Archenhold Auto Supply Co.
Watertown, N. Y.	National Service Co.
Wheeling, W. Va.	Onondaga Auto Supply Co.
Wichita, Kans.	The Howe Co.
Wilson, N. C.	Triangle Auto Parts Co.
Youngstown, O.	E. E. Emery & Company

REGISTERED



BURGESS-NORTON MFG. CO.
532 Peyton St., Geneva, Ill.

PERFECT PISTON PINS

Send us the names of the most popular cars in your neighborhood and we will send you a memo of the pins you should stock. Then order from your jobber.

BURGESS-NORTON MFG. CO.
532 Peyton St., Geneva, Ill.

COLE

Aero-EIGHT

\$600 to \$800 less

The Cole Motor Car Company announces a continuation of the Aero-Eight on a largely increased production schedule at the following reduced prices:

Touring Car	\$1885	Toursedan	\$2685
Sportster	1885	Sedan	2685
Roadster	1885	Suburban	2885
Coupe	2585	Berline-Limousine . .	2885

All prices f.o.b. Indianapolis plus war tax.

In connection with this sharp revision in prices, Cole has a dealer plan which marks the introduction of business sanity into the sale of motor cars.

The new prices bring this fine car within the reach of a far wider group of buyers in every town and city in the country. The Cole fran-

chise thus becomes one of the most desirable in the whole field. The increased production program creates opportunities for new dealers.

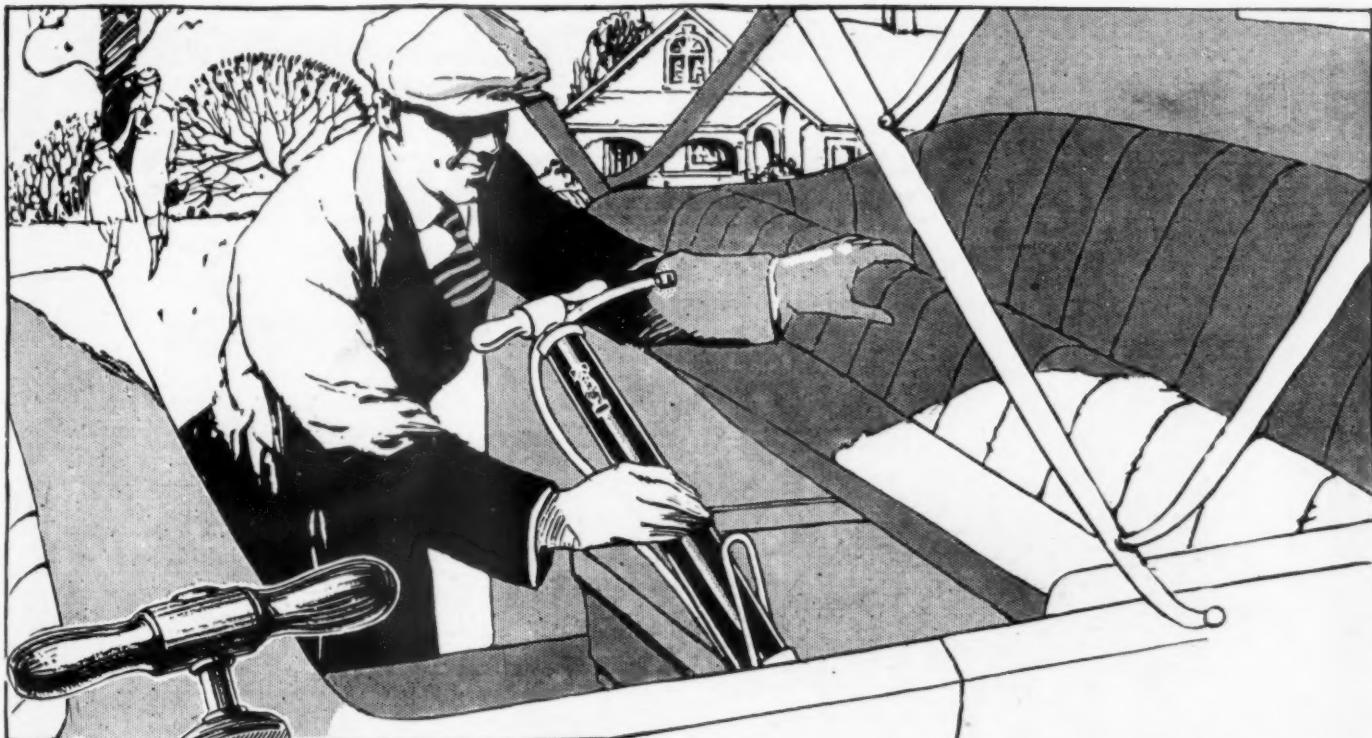
It is strongly urged that sound merchants of motor cars communicate with the Cole Motor Car Company at Indianapolis, immediately.

A wire beats the mail!

COLE MOTOR CAR COMPANY
Indianapolis, U. S. A.



There's a Touch of Tomorrow in All Cole Does Today.



The Best Reason in the World for Confidence—



Here is an article with unlimited possibilities. Low in price, high quality, guaranteed and embodying the most popular feature exclusively possessed by any pressure lubricating system, the Rose is attracting wide attention. It fills itself by a pull at the handle. Each gun tested under one ton pressure with light oil. For complete data write us today.

The Rose Tire Pump leads the Nation's Sales,
—Because it pumps quicker and easier,
—Because its price is right,
—Because it is built so sturdily it lasts much longer than the guaranteed five years.

As a result jobbers and dealers have sold more than three million Rose Tire Pumps in less than eight years at a total profit of \$4,500,000.

Today more dealers stock the Rose than any other tire pump line. More dealers carry the Rose line exclusively. Years of rapid sales and customer satisfaction have given unbounded confidence.

Take full advantage of the merchandising possibilities of this great national leader. Ask 'em to buy. Tell 'em about the patented valve that makes pumping easy and the five year guarantee. You will increase your profits.

ROSE TIRE PUMP

MANUFACTURED BY FRANK ROSE MFG. CO., HASTINGS, NEBR.

TWO GREAT DISPLAYS



This sells tire straps

Get this display rack into your store. It is the most convenient way to handle Gilmer Tire and Luggage Straps. It keeps them where your customers can see them. Keeps them sorted by sizes. Takes up less space than shelf-room—just hang the rack on the wall.

It is a reminder to your customers to buy. It allows them to handle the straps, which is a real selling feature. Ask your jobber about this display rack for Gilmer Tire and Luggage Straps.

This Shows the Actual Use of RADIATOR LACING



This display stand is shaped like the front of a car, with the hood up. Actual Gilmer Radiator Lacing is placed around the radiator and cowl.

Gilmer Radiator Lacing is now packed in individual cartons. Each carton holds just enough for one car. This new Gilmer idea is selling a lot of lacing. If you don't carry it, get your order in at once. Get the display stand, too! Ask your jobber about Gilmer Radiator Lacing—and the display stand. Write him to-day.

L. H. GILMER COMPANY

Philadelphia

Gilmer



*It's a Gilmer Product—
you can depend on it*



When You Drive on Concrete

watch yourself relax at the wheel and settle down to mile after mile of effortless driving.

Notice how the easy, accurate response of the wheel, the instant "pick up" and the swift action of the brakes give you the feeling of perfect security.

Only Concrete provides that even, firm, unyielding surface that the tires can grip, and makes the road skid-proof and safe even in wet weather.

Roads are being built everywhere the way motorists want them.

*Our Booklet R-3 tells other interesting things
about Concrete roads. Write for your copy*

PORLAND CEMENT ASSOCIATION

*A National Organization
to Improve and Extend the Uses of Concrete*

Atlanta	Des Moines	Parkersburg	San Francisco
Boston	Detroit	Philadelphia	Seattle
Chicago	Helena	Pittsburgh	St. Louis
Dallas	Indianapolis	Portland, Oreg.	Vancouver, B.C.
Denver	Kansas City	Salt Lake City	Washington, D.C.

Motor Wheel PRODUCTS



ON fourteen makes of motor cars, as impressive for their character as for their number, Tuarc Steel Wheels are standard factory equipment.

Millions of passenger automobiles, throughout the world, travel on wood wheels made by Motor Wheel.

Motor Wheel production of truck wheels is the largest in the world.

Pressed metal parts from the famous Gier Plant of Motor Wheel Corporation have been a potent influence in making motor cars and trucks lighter, stronger and more economical.



These are the material expressions of the bigness of Motor Wheel; but the whole of Motor Wheel Corporation, the real Motor Wheel, is best and truly revealed only in its *spirit*.

That spirit which was not content merely with the beautification of cars promised by early steel wheel development. So that in Tuars, Motor Wheel ingenuity gave to steel wheels demountable rims, universal outside



tire valves, standard hubs, together with unprecedented resilience and great strength.



It is that same spirit which, brooking no half-way measures, reaches clear back to ownership of standing timber to insure the excellence of the millions of wood wheels made by Motor Wheel.

It is Motor Wheel persistence and ingenuity which have produced, again and again, metal stampings previously considered impossible of manufacture by the known stamping processes.

The whole automotive industry, and its whole market, the public, benefit constantly and very tangibly by that Spirit which is Motor Wheel.



MOTOR WHEEL CORPORATION, LANSING, MICHIGAN

Tuarc
STEEL WHEELS

Get the Customer's Confidence and You Have All His Patronage

The best sort of customers you can have are those who have confidence in you, who believe in you because your statements and dealings always have been honest and open.

It is no more than good merchandising to "lay all your cards on the table" when you are selling a used car. Show your facts, what the car cost you, what you paid to re-condition it and your percentage of profit on the re-sale. Being unable to furnish detailed information gives the customer the idea that he is being "stung."

There are thousands of men and women financially able to buy used cars, but who do not understand business operations. When you sell them something for \$1.20 that cost you \$1, they think your profit is 20 cents and are quite sure you are a robber. Convince them with facts that your operating expense is 18 per cent, or as the case may be, and let them know your profit is only a couple of cents.

This rule applies admirably to the sale of a used car. Show the prospect all the facts and disarm suspicion. Let it be known you have only **one** price and that your prices are not fixed to suit your fancy but **always** are based on costs plus a fair profit.

Being open in all your business transactions is the principle of good merchandising. You can't lose by showing your hand in all you do in a business way. No method or principle of merchandising is better than this for building up confidence, that sure clincher of sales. I offer you these thoughts with good wishes for the New Year.

CLARENCE R. COMFORT.

Comfort Forms Inspire Confidence

The big advantage of ALL Comfort Forms is the fact that they furnish instantly ample evidence to the customer that you are giving them a square deal.

15,000 USERS

COMFORT

Printing Specialty Co.

101 North Eighth St.

St. Louis, Mo.

USED CAR RECORD																									
FIRM NAME	LOCATION																								
RECORD NO. 18	DATE ENTERED Oct. 30, 1920 by A.M.E.																								
PURCHASED FROM Wm. Conway																									
ADDRESS 85 Fauchard Pl. CITY St. Louis STATE Mo.																									
MAKE OF CAR Velox	TYPE Roadster																								
ENGINE MAKE Continental	ENGINE NO. 981463																								
CAR NO. 36784	MODEL 1918																								
LICENSE NO. & STATE 103-591 Mo.	CITY 7922 St. Louis																								
DATE PURCHASED Oct. 29, 1920 CASH Yes TERMS																									
REMARKS Made State transfer																									
<table border="1"> <thead> <tr> <th colspan="2">COST RECORD</th> <th colspan="2">SALES RECORD</th> </tr> </thead> <tbody> <tr> <td>PURCHASE PRICE</td> <td>480.00</td> <td>TOTAL COST</td> <td>575.00</td> </tr> <tr> <td>OVERHAULING</td> <td>33.00</td> <td>DEMONSTRATION EXP.</td> <td>9.50</td> </tr> <tr> <td>REPINTING</td> <td>50.00</td> <td>SELLING EXPENSE</td> <td>23.50</td> </tr> <tr> <td>ADDITIONAL EQUIPMENT</td> <td>12.00</td> <td>PROFIT</td> <td>166.00</td> </tr> <tr> <td colspan="2">TOTAL COST 575.00</td> <td colspan="2">SELLING PRICE 774.00</td> </tr> </tbody> </table>		COST RECORD		SALES RECORD		PURCHASE PRICE	480.00	TOTAL COST	575.00	OVERHAULING	33.00	DEMONSTRATION EXP.	9.50	REPINTING	50.00	SELLING EXPENSE	23.50	ADDITIONAL EQUIPMENT	12.00	PROFIT	166.00	TOTAL COST 575.00		SELLING PRICE 774.00	
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TOTAL COST 575.00		SELLING PRICE 774.00																							
SOLD TO Charles F. Davis																									
ADDRESS 3149 Shenandoah CITY St. Louis STATE Mo.																									
TERMS 274.00 Cash 1 note 200.00 pay Jan. 15 - 1 note 200.00 pay Feb. 15 - 1 note March 15 100.00 6% Int.																									
GENERAL REMARKS Car in excellent condition Overhauled Generator and bored Cylinders																									

The many values of Comfort's Used Car Record will become evident from a glance at the above fac-simile page, properly filled out. The Record is in book form—200 pages of heavy white paper—providing for 200 cars. The book is neatly bound in canvas-back cover. Pages are 11x8 in size.

The PRICE

\$3.50

We Pay
shipping charges
to your city on
All Forms

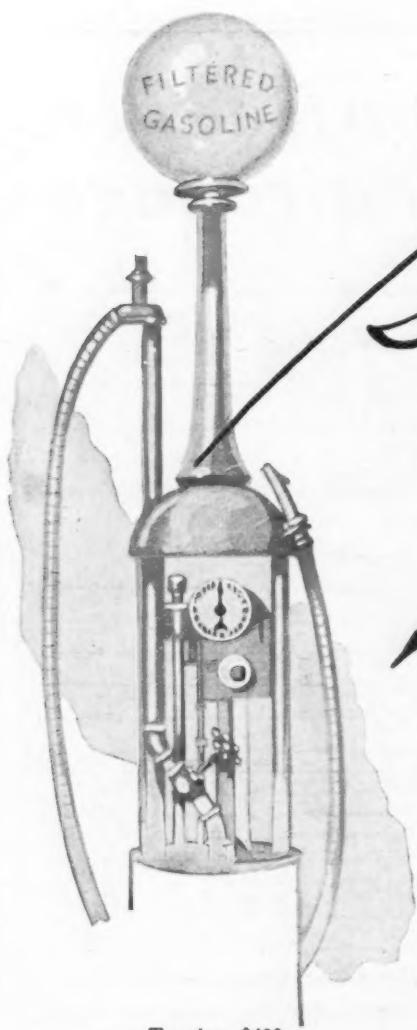
Comfort Printing Specialty Co.,
101 North Eighth St., St. Louis, Mo.

Enclosed find check (or money order) for \$3.50 for which please send me Comfort's Used Car Record, shipping charges to be paid by Comfort.

Name.....

Address.....

City..... State.....



Save $\frac{1}{3}$ the Gas



Displaying a complete line of motor cars—
Touring Car, Roadster, 2-passenger Coupe,
Coach and Sedan. The Gray is the center
of attraction at the Automobile Shows.

The Gray holds the World's Official Record
for gasoline consumption, won by its famous
Cross Country Run from San Francisco to
New York under sanction of the American
Automobile Association, with an average
gasoline consumption of 33.8 miles per gallon.

Gray Motor Corporation

Detroit, Michigan

Canada: Chatham, Ont.

Touring \$490
The twin of the famous Cross Country
Economy Car, responsive and dependable.

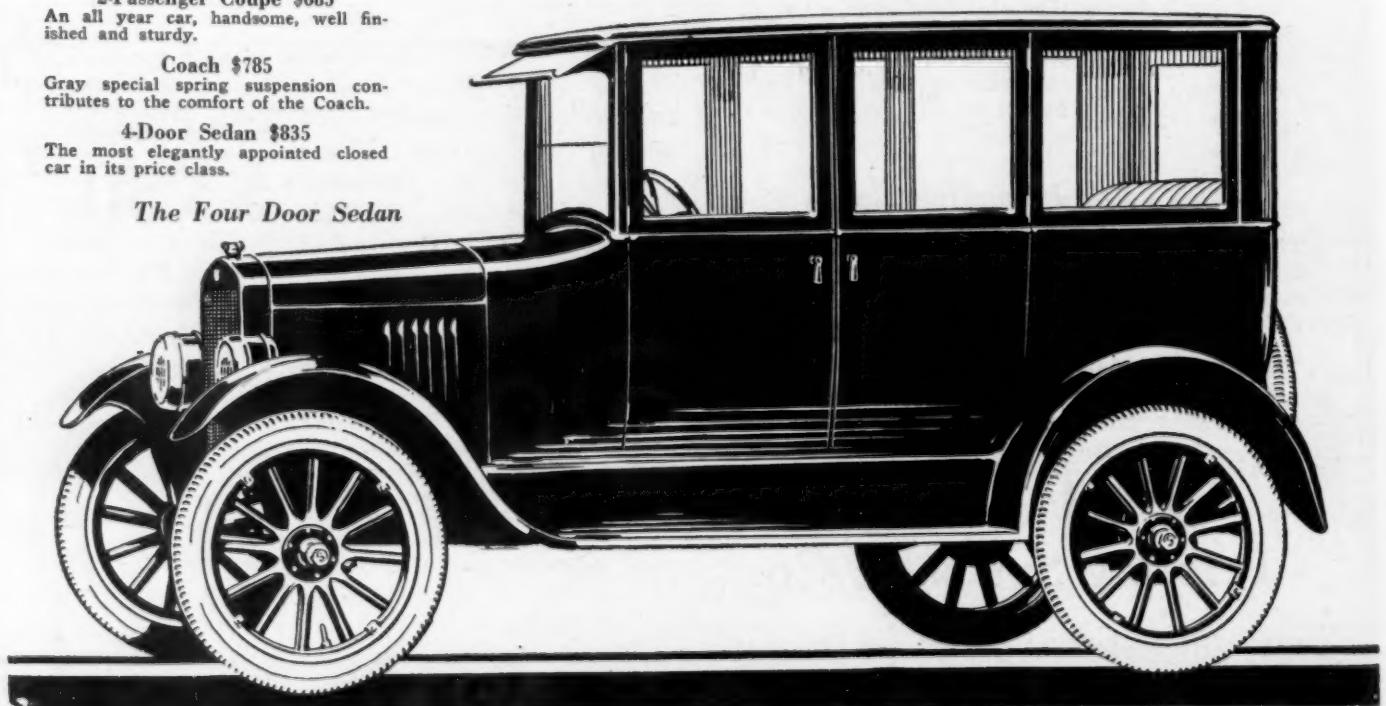
Roadster \$490
Comfortable, roomy, with ample luggage space. The rear deck is removable.

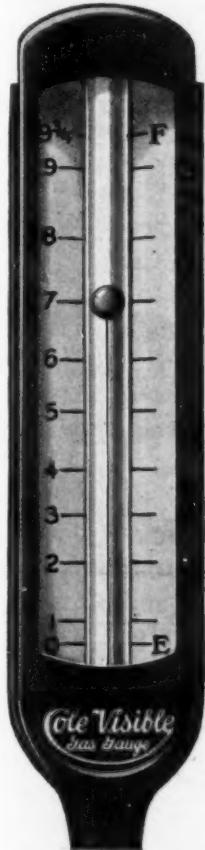
2-Passenger Coupe \$685
An all year car, handsome, well finished and sturdy.

Coach \$785
Gray special spring suspension contributes to the comfort of the Coach.

4-Door Sedan \$835
The most elegantly appointed closed car in its price class.

The Four Door Sedan





Actual Size



Big Profit for You — Sell Every Ford Owner

\$600
Guaranteed
for
One Year

Sell them all. Every Ford owner sees the need of the Cole mechanically operated gasoline gauge. Dealers and jobbers who now sell it say the Cole Visible Gauge is a fast mover and a big money maker.

The Cole Gauge attaches to the instrument board and is always visible from the driver's seat. Fits any Ford model and can be installed in less than an hour.

The Cole Visible Gasoline Gauge Tells:

- 1 How much gasoline is in the tank. The red indicator is always visible.
- 2 How many miles to the gallon.
- 3 How much gasoline to order at the filling station.
- 4 How much gasoline the Ford owner gets when he buys.

Demand Increasing Daily

The Ford owner is quick to see the advantage. He knows his exact gasoline supply at all times. He does not forget to refill.

Made by the company now furnishing special model gasoline gauges to sixteen automobile manufacturers as standard equipment. The Ford owner wants the same refinement and convenience. You can sell it to him at low cost—and good profit.

Send back the coupon or write us. Read our illustrated literature and complete terms of the money-making offer to live dealers and jobbers.

THE STEMCO ENGINEERING COMPANY
Light Car Division Dayton, Ohio

"Read as You Ride"

COLE VISIBLE GASOLINE GAUGE

Made Especially for Ford Cars

The Stemco Engineering Company
2nd and Webb Streets
Dayton, Ohio

Send me your circular describing the
Cole Visible Gasoline Gauge and tell
me about your liberal dealer-jobber offer

Name _____

Address _____

Little Giant

PIPE
WRENCH



Test That Grip

WHEN once you've seen the *Little Giant* Pipe Wrench take hold of a rusted-on nut or rod or pipe, and make it let go, you'll never be satisfied with the conventional pipe wrench again. You'll want a whole set of *Little Giants*, for they'll mean hours of time and much valuable labor saved.

Five sizes, 8 to 24 inches.

Jobbers, write for electros for catalog. The **GTD** trademark assures quality and quick turnover.



"The Well-Equipped Shop Gets the Business"

Miles From a Repair Shop With a Leaking Radiator—

But the modern motorist is undaunted by such a "fix." With Kester Acid Core Wire Solder and heat the leak is fixed in a jiffy—permanently if it's minor—and if the damage is serious, any novice at soldering can patch it securely enough to reach the nearest garage, where a mechanic with the proper tools—and Kester Solder—can easily make a permanent mend.

For the motorist and occasional user, Kester comes coiled in one-pound cartons or on one-pound spools, while the garage owner and mechanic find it more economical to buy on five- and ten-pound spools.



KESTER Acid Core WIRE SOLDER

REQUIRES ONLY HEAT



CHICAGO SOLDER COMPANY

4203 Wrightwood Ave., Chicago, Ill.

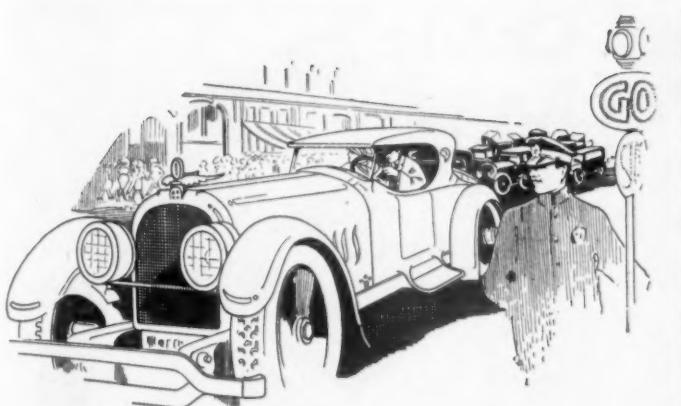
M.A. 1-11-23

Please send me a sample of Kester Acid Core Solder, no charges, postage prepaid.

Name.....

Address.....

Supply House.....



LET'S GO

EVERY DRIVER
EAGER TO GO!

Energy and responsiveness that puts the jump in your motor is always appreciated when the traffic cop flashes

GO—

And it's the motor with the light reciprocating parts that gets there first.

Motors equipped with **FOSIER** sensible light weight pistons have the jump on the motor equipped with the heavier factory type, because heavy reciprocating parts, absorb so much energy that should be applied to tractive effort.

FOSIER pistons yield 7 to 10% more power than ordinary factory pistons because they are 30 to 40% lighter.

Ask the user of **FOSIER** pistons, judge them by results; don't go by unproven claims.

Then order from our large catalog.

The more and better.

THE F-J PISTON REAMER

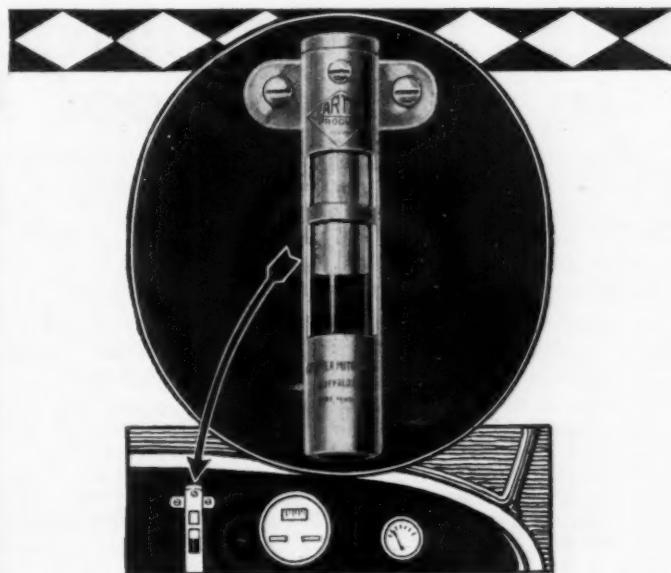


Adjusts like
a Micrometer

You have heard a lot about reamers, but how many of them that you know about will do the work as quickly and surely as the F-J? How many of them expand and contract the blades with just one adjusting screw like a micrometer? How many will ream both holes at the same time? How many of them will be their equal? When you want quality and service to give service with, get the F-J that you may have the best and can give quality service of the best.

Our reamer catalogue tells all about them. Write for it.

THE FOSTER-JOHNSON REAMER CO.
1044 Beardsley Ave., Elkhart, Ind.



A Money-Maker and A Money-Saver

The Carter Oil Gauge is such a popular seller because it pays for itself in the first month used. The highly-polished, nickel-plated gauge is conveniently mounted on the instrument board. A glance at the gauge shows the oil level in the crank case.

**Accurate—Easy to Install—
Guaranteed**

The Carter Gauge operates with unfailing accuracy in any weather. No moving parts, so there is nothing to wear out or get out of order. The gauge can be installed without special tools in a few minutes.

Carter Gauges are stocked by most of the good jobbers and are recognized as the standard oil gauge. Consistent national advertising is increasing the demand. If your jobber cannot supply you write to us.

**For Ford
Dodge and
Chevrolet
only \$3 75** **For Buick
Oakland and
Chandler
only \$5 00**

CARTER MOTOR ACCESSORIES, Inc.
388 Pearl St. Buffalo, N. Y.

CARTER OIL GAUGE

100 Ft. of Flawless Cable In a Dust-Proof Package

Figure the big advantage of selling starting, lighting and ignition cable in dust proof packages each containing a hundred feet of cable—instead of from bulky, dirt-collecting reels of a thousand feet or more. A dealer can carry ten assorted sizes and types for an investment that formerly permitted but one.

And ten sizes will sell a lot faster than one size will. That is why Goodrich Cable has a greater dealer attraction than any other cable on the market.

Motorists and shop men like it, too, because the package keeps it just as clean and fresh as when it left the factory. This insures quick sales and rapid turnover.

JOBBERS—DEALERS: You will be interested in our particularly attractive trade proposition. Full details, samples, counter displays and miscellaneous selling helps will be furnished—on request.

The Goodrich-Lenhart Mfg. Co.
Hamburg, Pa.

Goodrich
AUTOMOTIVE EQUIPMENT
Cable
Starting—Lighting—Ignition
Formerly M.P.



We will gladly, upon request, send you full information and illustrated literature or samples covering the complete line of Goodrich Automotive Cable.



THE COMMERCIAL VEHICLE

A magazine for the Fleet Owner, furnishing reliable and accurate news, information and advice on how to economically operate fleets of motor vehicles.

Contains statistics, diagrams and special articles, treating of successful truck operation in all the different trades and industries — Department Stores, Contractors, Shoes, Coal, Wood, Lumber, Dry Goods, Oil Delivery Companies, Bus Lines, Telephone Companies, etc., etc.

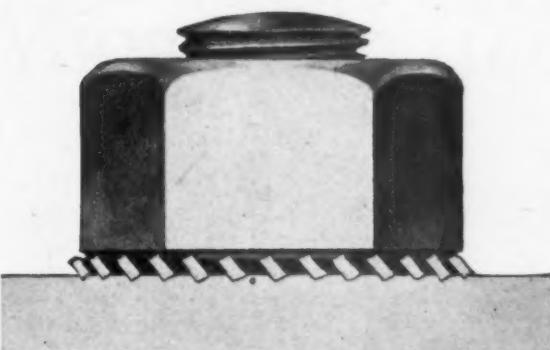
Read by leading Fleet Owners throughout the country—men, firms and corporations who own and operate from 5 or 10 up to hundreds of motor vehicles. One subscriber, for instance, owns and operates upwards of 1800 Trucks and maintains 30 Garages and Service Stations. THE COMMERCIAL VEHICLE is the only publication in this particular field and is a real necessity to Traffic Managers, Garage Superintendents and others who look after the care and operation of fleets of motor cars, trucks, busses, etc.

THE COMMERCIAL VEHICLE is published twice a month, on the first and fifteenth. The subscription price is \$2.00 a year (\$2.50 west of the Mississippi). Sample copies will be sent upon request.

THE COMMERCIAL VEHICLE

239 West 39th Street

New York, N. Y.



THE SHAKEPROOF GRIP—

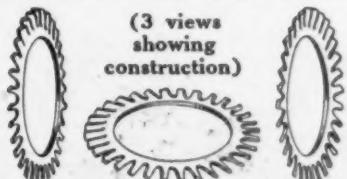
Here is a washer that becomes more and MORE effective under the strain of vibration. It has a bulldog grip that holds tight making the machine it is used on a closely knit mechanism—a solid unit.

Fine for auto trucks!

Fine for any use where vibration is likely to cause trouble!

Auto accessory dealers will find Shakeproof Lock Washers supply a popular demand. Anybody using washers—or lock nuts—in large quantities will want lots of Shakeproof Lock Washers. Their use quickly demonstrates their superior holding qualities.

See How It Is Constructed



A number of locking struts set at an angle of 45 degrees is, in brief, the principle of the Shakeproof Lock Washer. These little struts by gripping the nut above and the seat below are what make the washer lock tighter and tighter under increased vibration. They are stronger—and lighter—than the ordinary type of washer; and they have equal pressure at all points.

DEALERS: You will find our **QUICK TURN-OVER** Display Stand a big aid in selling Shakeproof Lock Washers. Finished in blue and white enamel; can be either set up or hung up; compartments for each size; furnished complete as follows:

Stand 100 package stock.....	\$ 6.50
Stand 200 package stock.....	12.00
Refills, per gross.....	8.64
Refills, per half gross.....	4.45

Shakeproof Screw & Nut Lock Company

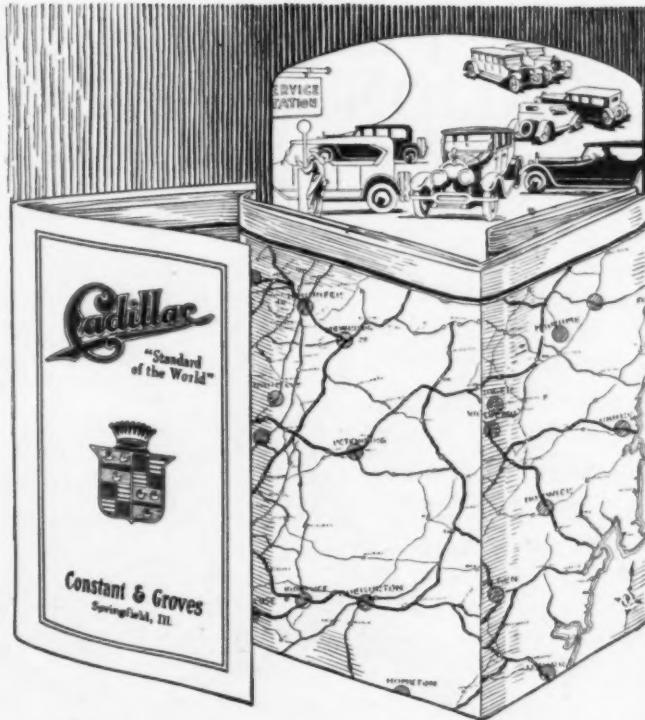
Wrigley Bldg., Chicago, Ill.

Branch Offices in the Following Cities:

New York, N. Y.
Beaver, Pa.
Houston, Texas
Minneapolis, Minn.

Indianapolis, Ind.
St. Louis, Mo.
San Francisco, Calif.
Toronto, Ont.

Cleveland, Ohio
Detroit, Mich.
Milwaukee, Wis.
Winnipeg, Man.



Advertising road maps route business to your door!

INCREASE sales and accumulate "good-will" by distributing RAND McNALLY Advertising Road Maps. Thousands of the leading concerns in the automotive industry are using this type of advertising successfully—automobile, tire and accessory manufacturers, garages and service stations. And so can you!

One hundred per cent of your customers are going somewhere. All are interested in maps and many inquire about routes and the location of garages and service stations. Give each customer a RAND McNALLY road map in a cover bearing your advertising. 100 per cent interested circulation!

And you secure the lasting patronage of the motorist, for you have done him a real service. You have saved the time of your employees by answering the customer's inquiry in the quickest, most intelligent way.

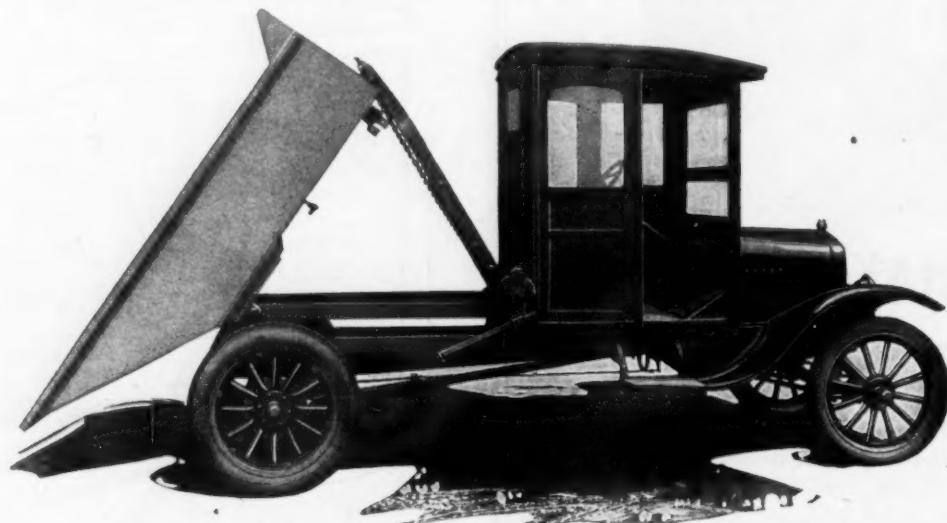
You can use RAND McNALLY Official Auto Trails Maps in covers prepared especially for you, or a special territory folder of the section in which you operate. The expense is surprisingly small. RAND McNALLY Advertising Road Maps may be bought economically in small quantities!

*Write for sample Advertising Road Maps.
Let us explain in detail how profitable
this type of advertising can be to you.*

RAND McNALLY & COMPANY
Dept. N-53, 536 S. Clark Street, Chicago

GALION No. 291 SPECIAL DUMP BODY

Guaranteed to dump any load absolutely clean



THIS is a steel dumping body built especially for hauling and dumping wet materials, and is water tight.

An excellent outfit for hauling wet garbage, concrete or other wet materials.

We make a complete line of steel bodies, also special bodies for all makes of trucks.

THE GALION ALLSTEEL BODY CO.

GALION, OHIO

RAIN-R-SHINE
ALUMINUM VISOR

ALUMINUM VISOR
FITS ALL CARS STEEL VISOR FOR FORDS
AND OTHER CARS

\$10 \$5

A SMALL STOCK COVERS THE ENTIRE MARKET

This visor is made entirely of metal. There is no glass to break, no reflection, no fabric to tear or sag. Notice the gutter for carrying off rain. Every one of these points is a good sales feature. Another exclusive feature is eight rows of blind perforations (invisible until punched out) at either end of the visor. By punching out the proper row

of perforations any space from 37" to 45" between brackets can be secured. Thus a windshield of any width can be fitted neatly and exactly. We have a good proposition for dealers who realize the value of selling high grade merchandise. Write for details.

THE INTERNATIONAL STAMPING CO., 406 N. Leavitt St., Chicago

2-R-3
Spare
Tire Carriers
—
FIT
ANY TIRE
ANY CAR

The Automatic Automobile Rack

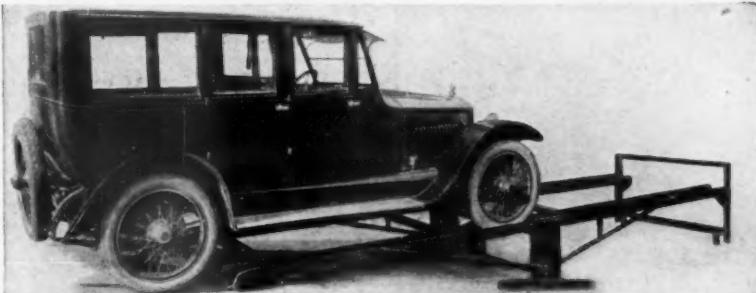
Indispensable for crank case service at all filling stations.

Built of heavy steel. Capacity 8000 lbs. Fool proof.

Fire proof. Thus complying with city ordinances. First cost is only cost.

High front bumper. Heavy 4" high runways insure against cars running off.

Length overall 20 feet. Shipping weight 1300 lbs. Average working height 36 inches.



Facilitates repair work at garages, service stations and repair shops.

Saves 50% in labor. Enables better and quicker workmanship and service.

Absolutely automatic. No hoists, jacks or raising devices required.

Compact. When not in service car may be parked on it.

Price \$150.00
F. O. B.
Philadelphia

Automatic Auto Rack Co., 327 Jackson Avenue
Long Island City, N. Y.
EXCLUSIVE REPRESENTATIVES WANTED IN EVERY CITY



Kawneer SOLID COPPER STORE FRONTS

REMODELING Old Buildings into Modern Sales Emporiums is quite easily accomplished by Installing Kawneer Solid Copper Store Fronts. The above shows but one of thousands of cases in which a Kawneer Front has worked a wonderful transformation. More than 150,000 merchants are now doing business behind Successful Kawneer Fronts.

If You Plan to Build or Remodel Your Store You Should Have a Copy of Our New Book of Store Front Designs. Pin the coupon to Your Letterhead and Mail it Today Before You Forget.

THE
Kawneer
COMPANY

1219 Front Street

NILES,

MICHIGAN

The
Kawneer
Company

1219 Front Street,

NILES, MICHIGAN

Please send me Book of Store Front Designs and Full Particulars about Kawneer Store Fronts.

Name _____

Address _____

Meilicke

Try This It Works:

Tell your customer that when he buys a MEILICKE Signal, he can have his money back instantly or a new signal if any fault of material or workmanship develops while he has the signal.

Tell him that this guarantee is backed by an old house of reputation, that cannot afford to offer shoddy goods.

Tell him the man behind is watching his tail light, and cannot miss a signal that blazes like a house a-fire right above it. Tell him that the Check-Lite on the dash warns him if broken wires, shorts or grounds have stopped his signal working.

Tell him we make our own brake switch in order to have it as reliable as the other parts of Meilicke Signals.

Ask your jobber now for discounts and illustrated descriptions. You'll make money.

MEILICKE CALCULATOR CO.
944 WRIGHTWOOD AVE.
CHICAGO ILLINOIS

Signals

Check-Stop

Sell One Every Day

To Battery

Check-Lite

Just Why

The Circle "S"

Speedometer Swivel Joint

**Works Better—Lasts Longer
Sells Faster**

Correct design—Materials the best—Self Aligning "V" type center bearing that is practically wear proof, inside sealed against water and grit by felt gaskets—All gear shafts fitted with bearings at both ends, making slippage impossible—Hardened steel worm gears—Changed to right or left by simple adjustment—Parts interchangeable.

Dealers and Jobbers—Write us today for full details.

F. W. STEWART MFG. CORP.
349 W. Austin Ave.
Chicago, Illinois

Manufacturers of the well known Circle "S" Automatic Windshield Cleaner.

**Come and See Us
When in Kansas City**

Located in the heart of the business and shopping districts. Convenient to everything.

Absolutely Fireproof.
Private Bath in Every Room
Circulating Ice Water
Free Morning Newspapers
Rooms with Bath \$1.50 and up.

Sam Josephson,
Manager.

At the Junction
9th and Main Streets

A Real Home

WESTGATE HOTEL
Kansas City, Mo.

HARRIS
TRADE MARK—REG. U. S. PAT. OFF.
OILS
AND
GREASES

**In a class
by themselves**

Lubrication is without question one of the most vital factors in automobile maintenance. One sure way to gain the good-will and confidence of your customers is to advise them to use Harris Oils. After they have used Harris Oils a short while, they will wonder why you didn't tell them sooner. For when it comes to a question of perfect lubrication, Harris Oils are in a class by themselves.

"America's Leading Lubricants"

Copyright AWHOCO 1921

A. W. Harris Oil Co.
Providence, R. I. Chicago, Ill.

Dealers—Write for sales plan.



Tell Them—Then Sell Them!

Your customers know Arvin comfort because they read DeLuxe advertisements in The Saturday Evening Post. A suggestion from you will sell this year-round convenience. You create a permanent customer, besides getting the substantial profit from each sale.

ARVIN HEATER

De Luxe

Heats ANY TYPE of Ford in a Jiffy. Attached to the front manifold lug; extends back through the footboard. Easily installed without special tools in 15 minutes. Retail price—only \$1.75.

Stock These DeLuxe Products NOW!

Sell the DeLuxe Tire Pump. Is Guaranteed for FIVE years. Retail price only \$3.50. Who wouldn't buy positive pump insurance for only 70 cents a year?

Order DeLuxe Ventilators TODAY! Prepare for big spring trade—bigger than ever before. Retails for only \$1.75.

Order Direct, Specifying Jobber

INDIANAPOLIS PUMP & TUBE CO.
1060 Drexel St. INDIANAPOLIS

Campbell RADIATOR and ENGINE COVERS



Cut from patterns as carefully prepared for each make and model car as those for a tailored suit Campbell Radiator and Engine Covers have a tailored look.

Manufactured with the same thoroughness, from the most suitable materials, they retain their fine appearance even longer than does the car itself.

Being attractive, correctly designed and unusually durable they give complete satisfaction.

It is this owner satisfaction that each year insures the Campbell dealer a most profitable business in Campbell Radiator and Engine Covers.

Let us send you latest information and prices.

The PERKINS-CAMPBELL Co.
622 Broadway, Cincinnati, Ohio
NEW YORK CHICAGO



Made of S. A. E. 1020 bar steel machined to .025 oversize. Then put through the Logan carbonizing process which gives a hard, uniform, wear-resisting exterior surface and a tough inner core.

LOGAN SEMI-FINISHED PISTON PINS

With a limited supply of the Logan semi-finished Piston Pins you can handle every replacing job.

To do this quickly and easily we furnish you with the Logan Piston Grinding Mandrel.

Logan Piston Pins are of a uniform high quality and can be relied upon to give the best of service.

Replace Pins the Logan way—Write for the details today.

KAUFFMAN
Metal Products Co.
Bellefontaine, Ohio

Use the LOGAN Piston Grinding MANDREL

An inexpensive tool that saves time and insures accuracy. Made especially for Logan Pin fitting. Two sizes cover all needs.

No. 1 \$1.50
No. 2 \$2.00

Perfect Ventilation

Reduces discomforts of hot weather driving

The Phillips "Keep Kool" Ventilator is new—something to make the driver more comfortable and keep him in a happy mood. Ford owners will be glad to know about it. Show it to them.

7 REAL ADVANTAGES

- 1. Gives more ventilation than a tilted windshield or any other ventilator on the market.
- 2. Directs cool air on the feet of the driver.
- 3. Absolutely rain tight when closed—protects the coil box.
- 4. Made to fit standard Ford windshield frame.
- 5. Adjusted in an instant—no screws to make tight or loose.
- 6. Can be locked in any position and does not rattle.
- 7. Adds to appearance of the car and very easily installed.

Jobbers and Dealers. This is a thoroughly tested article—guaranteed. Sells readily and at a good profit.

Distributors Wanted! Write for your territory now!

F. C. PHILLIPS CO., Stoughton, Mass.
Manufacturers Screw Machine Products.

Not a Specialty

KEEP VENTILATOR Kool
STOUGHTON, MASS.

A Necessity

CURTIS SINGLE AND TWO-STAGE AIR COMPRESSORS



An Original Design

The efficiency of a two-stage compressor depends on how thoroughly the air is cooled in the intercooler. Copper throws off heat faster than any other metal—it is used exclusively on Curtis intercoolers, thus assuring fullest advantage of two-stage compression.

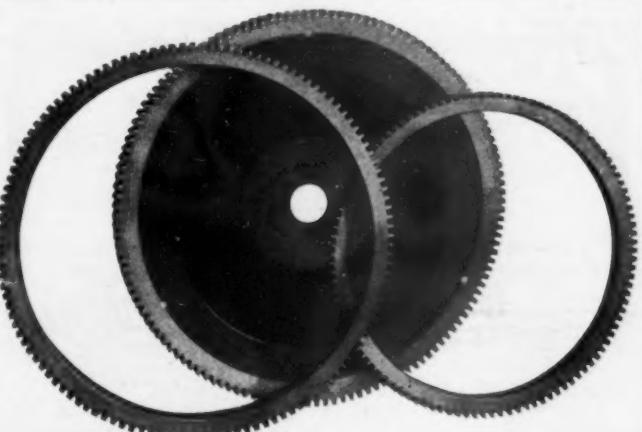
FIRST AND ONLY Two-Stage Compressor with a Copper Intercooler

CURTIS is recognized as a pioneer in the air compressor field. Sixty-nine years' manufacturing experience, twenty-six of which have been devoted to pneumatic machinery, has enabled us to develop compressors entirely original in design. As a result, Curtis Outfits have many exclusive features that assure dependable service with minimum upkeep.

Get the Facts

We manufacture a complete line of single and two-stage outfits—a size, style and arrangement to suit your needs. There are definite reasons why you should insist on a Curtis. Write at once for full details—our proposition and prices.

CURTIS PNEUMATIC MACHINERY CO.
1527 Kienlen Ave., St. Louis, Mo.
Branch Office:
530-H Hudson Terminal, New York City
Canadian Representative:
Joseph St. Mars, Winnipeg and
Toronto, Can.



Save Your Fly Wheels

When a tooth breaks in your starter gear why buy a new fly wheel. Simply turn off the gear teeth and fit on a Meachem Steel Ring Gear. It is much cheaper and will outlast the car. Ten thousand in stock.

THE MEACHEM GEAR CORP'N.
Syracuse, N. Y.

No Matter How Tight—



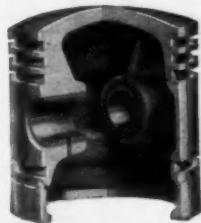
No matter how tight a wheel is on, this pulling tool will start it loose. We are wheel-puller specialists, and for years have supplied pulling tools that do the work. Arms dropforged from high carbon steel, screw casehardened with inserted tool steel point.

Three models, 4 sizes of each, all equipped with Locking Arms of latest design.

Our 24-page folder is an eye-opener. Write for it.

CRANE PULLER CO.

Arlington Mass.



Improve New and Renew Old Motors With

POWMETAL PISTONS

Sturdy — Non-Scoring — Cool-Running — Vibration-Reducing — Give the maximum of driving comfort with speed and power to spare.

The Dow Chemical Company
Midland, Michigan, U. S. A.

THE McGILL GUARD

Guard your shop from fire, your workmen from burns, your pocketbook from loss, and your customers from neglect. The switch is right under the thumb where it can't be "forgotten." Steel wire guard, steel reflector, both heavily tinned. Capacious hook, big handle. Compact because takes mill-type lamps. Ask your jobber.

McGILL MFG. CO.

Valparaiso, Ind.

*Better Light
for Less
Money.*

Thumb Switch
Saves Current



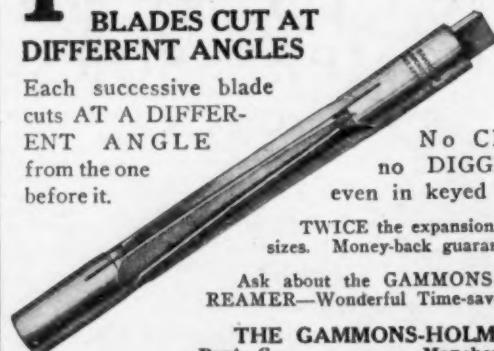
PAROB EXPANSION HAND REAMER

BLADES CUT AT DIFFERENT ANGLES

Each successive blade cuts AT A DIFFERENT ANGLE from the one before it.

No CHATTER,
no DIGGING IN —
even in keyed holes.

TWICE the expansion of others. All sizes. Money-back guarantee.



Ask about the GAMMONS TAPER PIN REAMER—Wonderful Time-saver.

THE GAMMONS-HOLMAN CO.
Dept. C. Manchester, Conn.

New Departure Ball Bearings



E. C. L. Pistons

ALUMINUM ALLOY, NON EXPANDING



How to Eliminate Piston Slap

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners. But it can now be eliminated.

With the E. C. L. Aluminum Alloy Non-Expanding Piston, E. C. L. Pistons may be fitted with a closer degree of clearance than cast iron pistons. They reduce the consumption of gas and oil — increase power and speed and eliminate spark knock.

Let us tell you more about this remarkable piston. Write for the details today.

E. C. LONG

Main Office and Factory

Detroit, Mich.

E. Z. 2 Sell—2!

An improved Magneto Plug for the Ford. Makes cleaning easier and quicker.

The flange screws permanently on to transmission, using old screw holes. The Plug screws into flange like a spark plug. No oil leaks. Guaranteed.

A great dealer proposition. Sells fast and the discounts are big. Get busy. Distributors and Dealers, write for details.

List Price, \$1.00.

The Hazel Specialty Co., Hazleton, Penna.

E-Z-2-KLEEN FORD MAGNETO PLUG



Air-Tight Steel Tank Co. PITTSBURGH, PA.



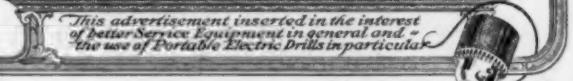
Tanks—High Pressure and Storage—Regular and Special to Order—Brazed or Welded—Gasoline Storage Tanks and Pumps—Structural and Machine Work. Send us your inquiries or specifications.



"THE Backbone of Automotive Service" helps in the selection of shop equipment and is full of hints of practical value to every shop.

Write for your copy! Sent free on request.

THE JACOBS MFG. COMPANY, HARTFORD, CONN.



"Good Mechanics + Machine Tools = Profits"

WHEN ALL advertisers demand their money's worth, all publications will provide circulation reports verified by the Audit Bureau of Circulations.

It is one of the mysteries of the advertising world that while all manufacturers demand verification of weight and quality in the material purchased, some of them still buy advertising space without knowing what they are paying for.

Such advertisers, however, are now exceptional. Most of them demand verified A. B. C. circulation statements before placing contracts.

In the case of Motor Age, the demand is immediately met.

It is a member of the Audit Bureau of Circulations.

PARANITE CABLE

Best For Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.

FOR 33 YEARS THE STANDARD
IF IT'S **PARANITE** IT'S RIGHT

Quality jobbers handle quality cable—
that's **PARANITE**.



Indiana Rubber & Insulated Wire Co.
210 S. Desplaines St., Chicago
Factory and General Offices—Jesup, Ind.

TRAFF-KOP

Signals Everybody



—cars behind
—cars approaching
—pedestrians
—traffic officers

Two luminous arrows—one on front fender, one on rear fender—left hand side—controlled by switch on steering post—makes your next move clear

The details—from your jobber or direct—will interest you.

The Motor Products Co.
Norwalk, Ohio

COMPLETE INFORMATION

On Automotive Cables, Description—
Sizes—Diameters, Classified as to Service—Fully Illustrated Will Be Found in
the Current Issue of

Automotive Equipment Association Catalogue.
The Automobile Trade Directory.
Chilton Automobile Directory.

The Packard
Electric Company

WARREN,
OHIO

Cleans BOTH Sides of Windshield

SELLS
ON
SIGHT



of Windshield

There are many good
reasons why Jiffy Wind-
shield Cleaners are becom-
ing popular among motor-
ists and dealers.

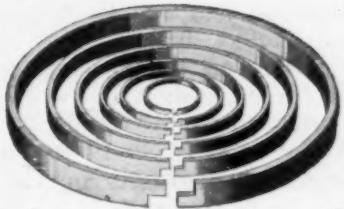
Car owners like them
because with one sweep
across they can clean and
dry BOTH sides of the
glass—assuring a clear view
of the road in any kind
of weather.

Dealers like them be-
cause they sell fast. Quick
sales are assured.

Get the interesting de-
tails—and our attractive
trade offer.

The La Vettes Mfg. Co., Inc., New Haven, Conn.

QUALITY
SNAP RINGS



"More Than a
Million a Month"

The Piston
RING COMPANY
MUSKEGON, MICH.

Get This "Pioneer" Garage Special

Electric Drill
and Valve Grinder

Greatest time and money saver,
as well as money maker, for
your shop—

"It Will Do The Work"

Louisville Electric Mfg. Co.
Incorporated Louisville, Ky., U. S. A.
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.

REGROUND BEARINGS

OUR REGRINDING PROPOSITION
WILL CUT DOWN YOUR BALL
BEARING BILLS. TRY US AND
BE CONVINCED. SATISFACTION
GUARANTEED

AHLBERG BEARING COMPANY
311-327 EAST 55th ST. CHICAGO, ILLINOIS.

ATLANTA
BOSTON
CLEVELAND
DETROIT
KANSAS CITY
LOS ANGELES
MINNEAPOLIS



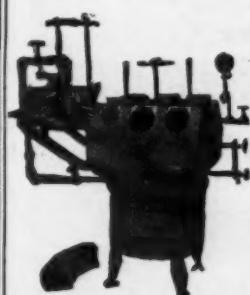
NEW YORK
PHILADELPHIA
PITTSBURGH
PORTLAND, ORE.
PROVIDENCE
SAN FRANCISCO
ST. LOUIS - CHICAGO

The Standard Vulcanizer
Equipment for Repair
Shop Use

A complete line, covering every require-
ment of the trade.
—Vulcanizers, Retreaders, Tube Plates,
Steam Boilers, Tools, etc.

Write today for descriptive literature.
THE AKRON RUBBER MOLD &
MACHINE CO.

919 Switzer Ave., Akron, Ohio



AKRON-RUBBERMOLD
TIRE REPAIR EQUIPMENT

Every time you change a tire
ask the driver:

Have you plenty of patches for your 5-Minute Vulcanizer?

Proved to be the easiest way to sell Shaler Vulcanizers
as well as the Patch-&-Heat Units to use with them.

Are You Making Money?

If you aren't making enough out of the
battery business, that is all the more reason
why you should handle the Dragon.
Dragon dealers are building up a great
reputation for themselves and making real
money at the same time.

Write and let us state our proposition.

Englert Manufacturing Co.
Pittsburgh, Pa.

Dragon Storage Battery

MR. RADIATOR REPAIRMAN



Make your own radiator cores
and save 20% to 50% of their
cost, give your customers quick
service and a better core for less
money. No need to carry large
stocks of cores, and no damage
in shipping. Increase your
volume of business. Send for illus-
trated booklet describing our
radiator core equipment. We
supply small shops with formed
core stock and the small fixtures
to build cores complete. Write
for information to

Radiator Engineering Co.
626 Nesslewood Ave.
Toledo, Ohio



AMERICAN Springs

will satisfy your
customers
Every Spring Thoroughly Tested

AMERICAN AUTOPARTS COMPANY

5175 French Road
Detroit, Mich.

ANY CAR ANY MODEL ANY YEAR
DISTRIBUTORS EVERYWHERE—WRITE FOR CATALOG

SHAFER

Self-Aligning ROLLER BEARING

offers a complete line of roller bearing replacements for cup and cone ball bearings. Details of sizes upon request.

THE SHAFER BEARING CORPORATION
6501 W. Grand Avenue, Chicago

INTERNATIONAL

MOTOR TRUCKS for low-cost hauling

Models range from the 2,000-lb. Speed Truck to the 10,000-lb. truck.
Some territory is still open for dealers.

International Harvester Company of America
(Incorporated)
Chicago, U. S. A.

IT FLOATS THE CAR ON AIR
Watch for **R A S**
FLOATS THE CAR ON AIR
details in this paper
Jan. 25

BRUNNER
AIR COMPRESSORS

GOOD FOR
"TWENTY YEARS AT HARD LABOR"
BRUNNER MFG. CO., Utica, N. Y.

51-6/10 MILES ON A GALLON OF GAS

It is the official world's record-breaking test with Ford Touring car. The new 1922 Stromberg Carburetor and Hot Spot did it—made this marvelous mileage possible. Tens of thousands of Ford owners are now obtaining more miles on a gallon—quicker getaway—easier starting—increased power and speed—all because of having their cars so equipped. Live dealers are requested to write for facts pertaining to territory.

Stromberg Motor Devices Co.
64 E. Twenty-Fifth St. Dept. 27 Chicago, Ill.

MONOGRAM
The
Self Locking Radiator Cap

SEE PAGE 5

MARTIN
MEANS
EQUIP

Martin Auto-Hoists

See our full-page announcements in
the December 13th and 27th issues
of Motor World and the December
28th issue of Motor Age.

THE T. A. MARTIN EQUIPMENT CO., Inc.
Bridgeport, Conn.

TURNER  QUALITY

GUARANTEED

Axle Shafts	Spring Shackle Bolts
Propeller Shafts	Piston Pins
Pinion Shafts	Fan Bolts
Pump Shafts	Spindle Bolts

*Buick Valve Lift Assembly with Guide
for Passenger Cars and Trucks Sold Thru The Jobbers*

The Turner Machine & Mfg. Co., Kansas City, Mo.



“AUTEX” EXTENSION REEL

For Electric Lights.

Fully approved by the National Board of Underwriters.

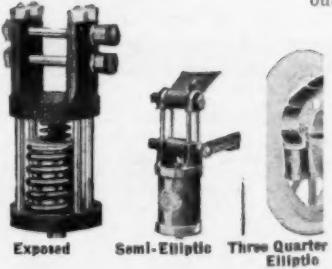
Patented: Oct. 1915, Jan. 1917 and Dec. 1920.

The “AUTEX” is also being extensively used by many of our largest industrial plants for portable drill and other electrical unit extensions.

Made in two sizes—for 25 ft. and 50 ft. reinforced cord. Automatically winds and locks at any desired point. Its swivel-joint feature enables the light to be taken in any direction from the reel. Write for particulars.

The Cincinnati Specialty Mfg. Co., Inc.
Powers St., Cincinnati, Ohio

The **JOHNSON**
SHOCK ABSORBER



The Only Coil Spring Shock Absorber With Recoil Check

The small inner spring of the Johnson takes care of light shocks and prevents a sharp recoil. The large outer spring takes care of the heavier shocks. This double action feature is the reason back of the remarkable success of Johnson Shock Absorbers. It is a feature that puts the Johnson in an exclusive class above all competition.

Strong, durable construction throughout. The four rods, which carry the load, are of $7/16$ " cold rolled steel. Springs are of heat treated steel. We have an unusually attractive dealer proposition. Ask your Jobber or write us direct for details.

The JOHNSON SHOCK ABSORBER CO.
2613 S. Michigan Ave., Chicago



MANLEY FORD-CHEVROLET UNIVERSAL ENGINE STANDS

The final perfection in a Ford Engine Stand. Mounts the complete Power Plant, including Oil Pan, turns the Motor in a complete circle in both the vertical and horizontal planes. Fitting is absolutely safe, cannot pull out water jacket castings. Improved diagonal base. Swinging Tool Tray to hold tools at the mechanic's finger tips. Cone Clutch Locking method, smooth powerful and safe. Converted into an Axle Stand in three minutes.

MANLEY MFG. CO.
YORK, PA.

The Bearings Company of America



Your present Thrust Bearings sizes duplicated.

Thrust Ball Bearings made to your B/P's.

Quotations made promptly on all inquiries.

THE BEARINGS COMPANY OF AMERICA, Lancaster, Pa.
Western Sales Office, 1012 Ford Bldg., Detroit, Mich.



JOHNSON Combined Gas Torch and Soft Metal Melting Pot

For melting lead, babbitt, solder, zinc, etc. Pot holds 25 lbs. of metal. Torch used for heating soldering irons or any pre-heating work.

Has the Johnson Direct Jet Bunsen Burner with shut-off valve and pilot light. This Burner will produce a flame temperature of 2250° without the use of any forced air blast.

Write for descriptive literature of Gas Appliances.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids, Iowa

Waukesha
TRADE MARK

High Torque Motors

Positively superior in economy and durability because it maintains its greatest pulling power at average speed.

Built upon a principle that years of most strenuous tests have proved right. The “buy word” of thousands of tractor men is “Waukesha.” Manufacturers, write us. There's a Waukesha to suit your needs.

Write for Complete Information

Waukesha Motor Co., Waukesha, Wis.




Two-Plug Ignition

Ordinary Plug SU-DIG Plug
To a battery system

**MORE-POWER
GREATER MILEAGE**

Do You Understand Two-Plug Ignition—
the system that ignites the gas at two opposed points at once? This burns the mixture completely and almost instantly; increases power and gasoline mileage; saves fuel and lessens carbon accumulation and spark manipulation. SU-DIG Series Spark Plugs added to the plugs now in your engine give Two-Plug Ignition.

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Connecting Rods Rebabbitted

 and rebuilt with new bolts and nuts, laminated shims, new pin bushings.
 Information and prices on request.

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GEARS
 WORLD'S
 STANDARD
 REPLACEMENT

PERFECTION
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PRIME WITH HEAT

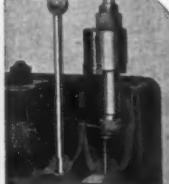
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DEALERS: Order early.
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DUESENBERG
Original Straight Eight
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 Air Compressors: Gasoline and Oil Storage Systems; Heavy Metal Storage Tanks; Oil Burning Systems; Furnaces and Forges; Oil Filtration Systems; Water Softening Systems
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 New Gas at Cabs

The Bear Tractor
 Write today regarding unassigned territory, and ask for catalog and distributor's and dealer's proposition.
 Bear Tractors Inc., 5309 Park Place, New York City
The Tractor that Delivers its Power to the Drawbar

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 Doubles Your Profits
 Grinds All Valves and
 Valve Seats with an
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 runs 15,000 r.p.m. Write
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 work. Circular.
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GUAY CLUTCH DISC & PLATE
 For Dodge Bros. Cars
 Models for other cars will be announced shortly. Extraordinary flexibility and durability are gained by passing every thread of asbestos over and under the steel fingers at a given length of $\frac{1}{4}$ inch. Thus all strings are under the same measured spring tension. Steel and asbestos only materials used. No wires or rivets to cause uneven wear. Price of complete set, \$12.00. Good discounts to trade. Write for complete details.
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 Mfg. Division
 159 W. Illinois St., Chicago

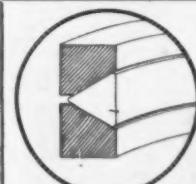
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ROTOR
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 PISTON RINGS
 Known for Width and Durability

WedgeRite Piston Rings are made up of three sections; two outer rings and a wedge-shaped ring of untempered spring steel. The wedge-shaped ring bears against the two outer rings and exerts a constant outward pressure—insuring permanent maximum ring efficiency. Learn the details. Pittsburgh, N. Y.

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 All-Size Step Plate fits all running boards by simply moving toe plate forward. Welco Ford Accelerator works independently of hand throttle; very easy installation. Welco Blanket Holder keeps blanket securely on radiator against strongest wind. Write for trade proposition.
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 TRADE MARK
RADIATOR CEMENT
 Quicker—Safer—More Profitable
 THE BURNLEY BATTERY & MANUFACTURING CO.
 Northeast, Pa.

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 HAYES WIRE WHEEL CO. JACKSON, MICHIGAN

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Only one connection
with the carburetor.

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new chassis oiler operates from driver's seat while car is in motion.
Have you written for information?

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Install one or more units of the Correct Measure Motor Oil Display Pump on your curb. "Make him think of oil." This pump is handsome in design, sturdy, holds 12 gallons. Empty weight 65 lbs. Low center of gravity. Can be rolled to curb in morning and back indoors at night. Delivers $\frac{1}{2}$ gal. in 12 seconds. Price \$45 per unit. Write for details.

CORRECT MEASURE MOTOR OIL DISPLAY PUMP

Correct Measure Co., Inc.

Rochester, Pa.



Sell wrench sets instead of single wrenches! Snap-On owner selections are now offered for 18 leading makes of cars. Range in price \$4.60 to \$9.30. Reach every important service or adjustment nut.

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Unequalled in its Performance

Write us

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Won't Leak Because They're Sealed With Oil
"NO-LEAK-O" Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell. No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas.
It will pay you to stock No-Leak-O at once.
Price 50c and up.

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In twelve sizes, to cover all the sizes of piston pins in the cars, trucks and tractors being manufactured.

Write for Catalog SIX A.
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KING QUALITY

ALL THE NAME IMPLIES

PISTON PINS

King Quality—highest in everything but price
Automotive Division

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"Once an Owner, Always a Friend"

The complete Auburn line of 1923 including the Smaller Six provides a most attractive business opportunity for the dealer.

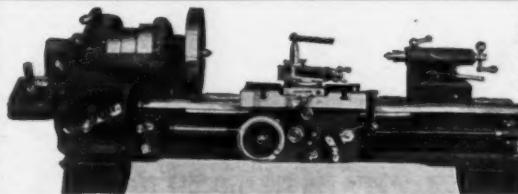
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EVERYDAY—the Only Ring That Is Absolutely Locked

The EVERYDAY Master Lock locks the piston ring Edgewise—Widthwise—Lengthwise, just like a solid ring. You can't force gas—oil—power past the joint.

Write now for the Xtra Profit Plan on EVERYDAY Piston Rings.

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LATHES
for Garages and
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Be sure to get
our Special
Prices.

Carroll-
Janssen
Machine
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"Bull Dog" Foot Accelerators for Fords
A live article—in demand because it always makes good.

RUBBER COVERED PEDAL
MAT BINDER.
NON-SLIP FOOT REST

The W. H. Thomas Mfg. Co.
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Sales Representatives
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Lycoming

MOTORS

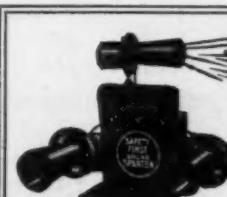
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LYCOMING MOTORS CORP., WILLIAMSPORT, PA.



Like a Pocket in a Shirt
Has many uses. Drain crankcases, test tubes, scrub parts, carry tools, keep parts, throw scrap in it. One piece of heavy gauge galvanized steel. Won't tip over. List price \$2.50. West of Rockies \$3.00.

Sales Dept.
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YAHOO TA

Let your customers hear the

Sparton speak!

Special display board given free with initial order for six. Write for complete particulars.

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As we have reduced the price on Red Giant Rim Tools to \$3.25 to dealers, you cannot afford to let this opportunity pass to get a real rim tool at a cheap price.

Sold in every state in the Union, Canada, Mexico, Holland, Belgium, Denmark and the Hawaiian Islands. If your jobber cannot supply you, do not take something "just as good," but order direct.

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Lynchburg, Va.

Butler
Replacement Parts Manufacturers

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Axle Nuts, Keys, Keystock, Propellers, Pinion Shafts, Jackshafts for all models of cars—large stock.

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A LITTLE SELF CONTAINED MACHINE SHOP
THE FRANKLIN
Universal Valve and Cutter Grinder

The biggest little tool you can install in your shop. Requires no counter-shafting or pulleys. Grinds valves, reamers and cutter tools. Is equipped with a flexible shaft for reaching out-of-the-way places with a grinding wheel or wire brush, and can be hooked up for drilling. Don't spend a lot of money for expensive equipment until you have investigated this handy, efficient and reasonably priced tool. Your jobber will tell you, or write us direct.

FRANKLIN MACHINE & TOOL CO.
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Bringing In Crippled Fords Is Bringing In Good Profits

EKERN'S EMERGENCY AXLE NO. 4

Fits the bearing-space in Ford rear axles. Tow at high speed with perfect safety. Quickly attached. Send for price and details.

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with the hard, long life, plates

Write for proposition. Your territory may be open.

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Distributors—Good Money

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SERVICE WRENCHES FOR DEMOUNTABLE RIMS

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Fly-Wheel GearBands

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SOCKETS WILL NOT BREAK

This new socket wrench is something every mechanic has long wanted. Made from selected stock, specially heat-treated and hardened. No other sockets are quite so strong, no other ratchet quite so well made, no other universal quite the same. Care and quality is evident in every unit. Exceptional facilities allows marketing at an attractive price. Write for guarantee.

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ARMATURES
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\$2.00

MOST ANY
TWO UNIT
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ALL WORK GUARANTEED—WRITE FOR PRICE LIST
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The COURIER Six
The most completely and conveniently lubricated car in America.

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No Springs
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No adjustments.

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Simple Positive mechanical action.

6 TO 12 CARBURETORS IN ONE

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Double check. Pay only for the gas you get. Makes satisfied customers. Write for catalogue.

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with
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Improved
SHOCK ABSORBERS

Halladay Improved Direct Suspension Shock Absorbers are the best made. Easy riding, long wearing, money saving. Three sizes—roadster, sedan, touring and coupe. Write your jobber or us for catalog and discounts.

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GUARANTEED TIRES AND TUBES

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The Original Ignition Gauge Utilizing Neon
Instantly locates spark plug and other ignition troubles.
Place it alongside the oil can for convenience. Test the
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\$1.00 with Clip and Screws

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Pioneer in commercialising the elements of the air.



For All Cars and Trucks

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The Custom Built Car



The Aristocrats of Motordom

7 Models-Open and Closed

Distributors in principal cities

Open territory now being closed

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TRANSMISSIONS
BROWN-LIPE-CHAPIN
DIFFERENTIALS

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Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

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TIRE PUMP

VACUUM PRESSURE PRODUCTS CO., Inc.
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Specify "R. S. P. VALVES"

Special Alloy or Chrome Nickel
Standard and Oversize—Forged in one piece
Send for list

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Automatic Control. Automatic Release.
Start against no load.
Style E-2: 2 1/4 cu. ft. per minute.
140 lb. pressure. Tank 16x36, 32 gallon.
25 ft. hose with air chuck. 3/4 H. P. Motor.

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PROTECTS THE DRIVER FROM GLARE
Makes headlight glare, sun glare, road glare and snow
glare harmless. Driver looks through it—vision not ob-
structed. Made of sapphire-blue Belgian optical glass.
Two models for open and closed cars. Price, \$3.50.
Order through your jobber. Distributors wanted.

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American Bosch Magneto Corp.
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Branches:

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Over 500 Service Stations in 500 Centers

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Write for interesting circular on oil pumping and details about this fast
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\$2.50 **WEBSTER**
MAGNET LIGHT
—STICKS WHERE STUCK
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Cut-Outs
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Excel in merit. You profit by
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Write for de-
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WICACO Twin Cut Piston Ring—

With the Wandering

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F-40 For Fords

and Chevrolets. A thrust bearing
for the differential. Makes 'em
push easier, climb better, dodge
axle trouble.

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The Borg & Beck Clutch

Over 1,500,000 in Use

Write for instructions for adjusting Borg & Beck Clutches.
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Do not overlook these live selling and profit-
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Four styles—one for every car.
No. 503 with the Hump Base.
No. 504 with Ell Base. No. 505
Plain Lock-Type. No. 506 Swivel
Lock-Type.
Packed fifty to carton; five display
cards of ten each.

The company that took the rattle
out of Anti-Rattlers

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LONG-LIFE
TIRES AND TUBES
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tubes make money for deal-
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The Velie dealer franchise is today one of the most attractive in
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COMPLETE PISTON SERVICE

A ring for every purpose—Spiral Cut, Oilless and StepSet—and a
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The Van Norman
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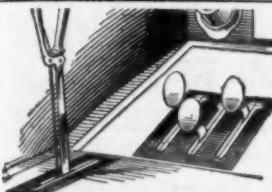
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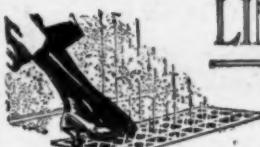
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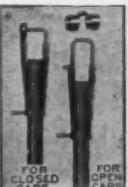
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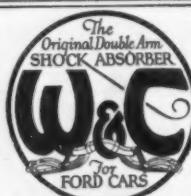
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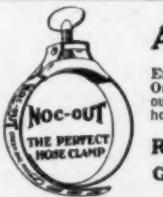
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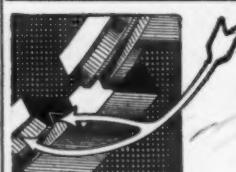

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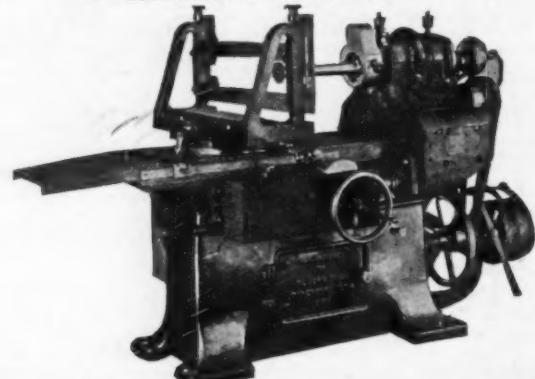
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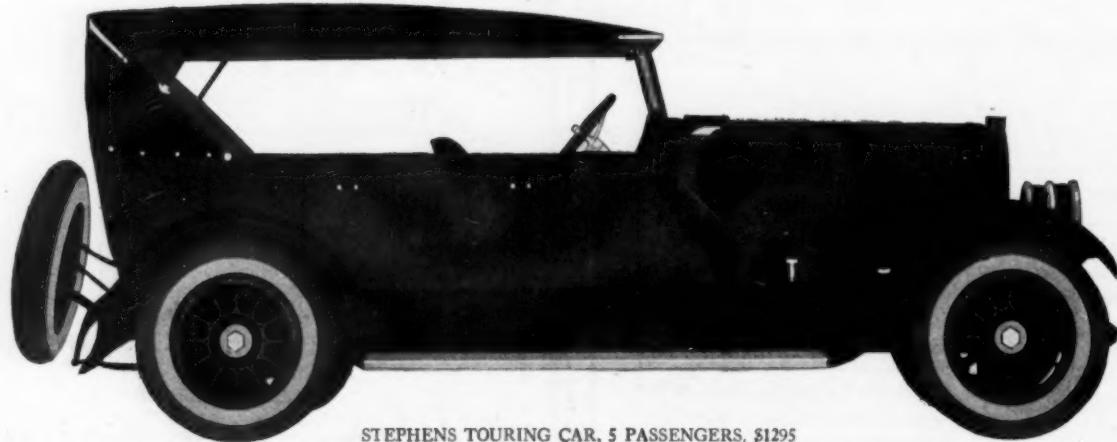
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Successor to B. L. Schmidt Co.



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Finer Motor Cars at Lower Prices

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Step-Cut, 30c



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